RTDS
(REMOTE TRANSMITTER DIAGNOSTIC SYSTEM)
INSTALLATION GUIDE

IMPORTANT INFORMATION

EQUIPMENT LOST OR DAMAGED IN TRANSIT.

When delivering the equipment to you, the truck driver or carrier's agent will present a receipt for your signature. Do not sign it until you have: 1) inspected the containers for visible signs of damage and 2) counted the containers and compared with the amount shown on the shipping papers. If a shortage or evidence of damage is noted, insist that notation to that effect be made on the shipping papers before you sign them.

Further, after receiving the equipment, unpack it and inspect thoroughly for concealed damage. If concealed damage is discovered, immediately notify the carrier, confirming the notification in writing, and secure an inspection report. This item should be unpacked and inspected for damage WITHIN 15 DAYS after receipt. Claims for loss or damage will not be honored without proper notification of inspection by the carrier.

RF PRODUCT TECHNICAL ASSISTANCE - REPAIR SERVICE - REPLACEMENT PARTS.

Technical assistance is available from Broadcast Electronics by letter, prepaid telephone, fax, or E-mail. Equipment requiring repair or overhaul should be sent by common carrier, prepaid, insured, and well protected. If proper shipping materials are not available, contact the Customer Service Department for a shipping container. Do not the mail equipment. We can assume no liability for inbound damage, and necessary repairs become the obligation of the shipper. Prior arrangement is necessary. Contact the Customer Service Department for a Return Authorization.

Emergency and warranty replacement parts may be ordered from the following address. Be sure to include the equipment model number, serial number, part description, and part number. Non-emergency replacement parts may be ordered directly from the Broadcast Electronics stock room by fax at the number shown below.

FACILITY CONTACTS -

Broadcast Electronics, Inc. - Quincy Facility
4100 N. 24th St. P.O. BOX 3606
Quincy, Illinois 62305
Telephone: (217) 224-9600
Fax: (217) 224-9607
E-Mail: General - bdcast@bdcast.com
Web Site: www.bdcast.com

RF PRODUCT TECHNICAL ASSISTANCE - REPAIR - EMERGENCY/WARRANTY REPLACEMENT PARTS -

Telephone: (217) 224-9600
E-Mail: rfservice@bdcast.com
Fax: (217) 224-9607

NON-EMERGENCY REPLACEMENT PARTS -

Fax: (217) 224-9609

RETURN, REPAIR, AND EXCHANGES.

Do not return any merchandise without our written approval and Return Authorization. We will provide special shipping instructions and a code number that will assure proper handling and prompt issuance of credit. Please furnish complete details as to circumstances and reasons when requesting return of merchandise. All returned merchandise must be sent freight prepaid and properly insured by the customer.

RTDS

(REMOTE TRANSMITTER DIAGNOSTIC SYSTEM)

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INTRODUCTION

INTRODUCTION.

The Broadcast Electronics RTDS (Remote Transmitter Diagnostic System) is a PC system designed to monitor, control, and troubleshoot FM T-Series broadcast transmitters. The system consists of an RTDS microprocessor controller module and RTDS PC software.

The RTDS controller module contains the firmware. The firmware directs the operation of the transmitter and communicates with the RTDS PC software. The module plugs directly into the standard controller module socket on a T-Series controller circuit board.

The PC software is a Windows 95 program containing the RTDS user interface. The software can be installed on any Windows 95 PC. The user interface is divided into two screens: 1) the transmitter controller screen and 2) the detailed readings screen.
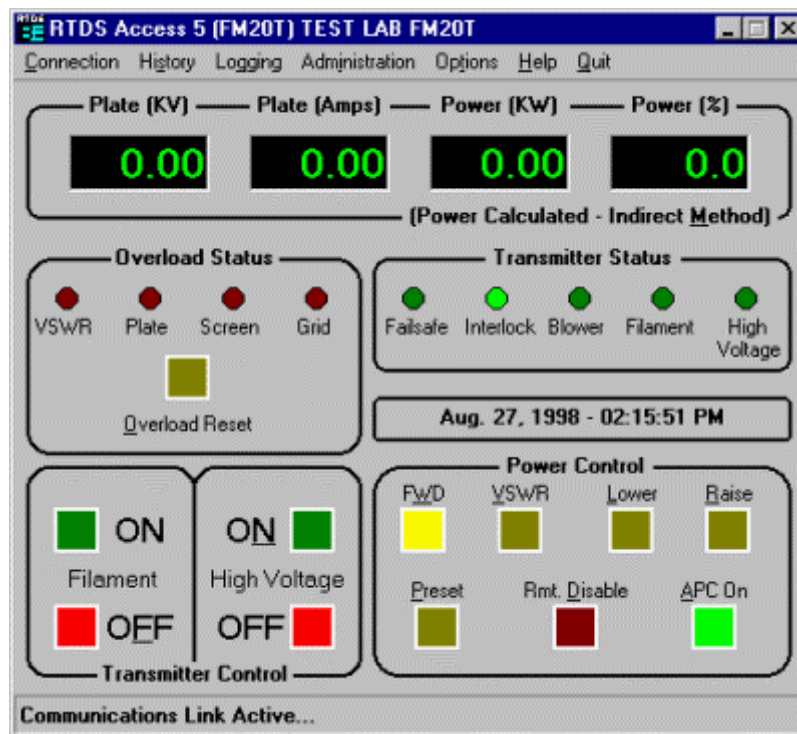
RTDS59

TRANSMITTER CONTROLLER SCREEN
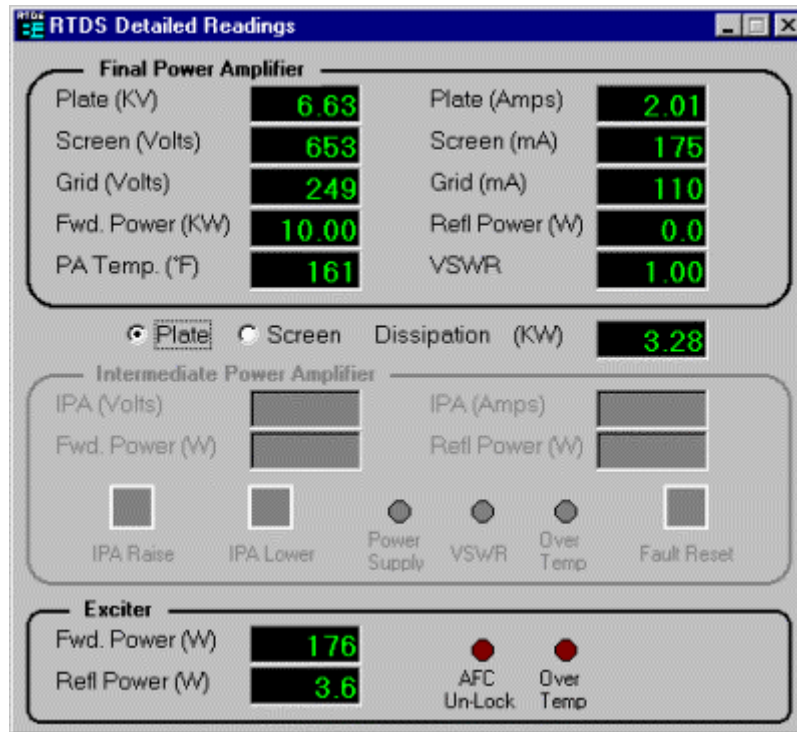
DETAILED READINGS SCREEN

The primary function of RTDS is to monitor and maintain FM T-Series transmitter operation. Communication with the transmitter site can be accomplished using a variety of systems. For example, RTDS can use a PC with a modem to connect to one or more transmitters at a site. Additional communication systems include: 1) leased telephone line, 2) direct connect, 3) cellular, and 4) RF. Once connected, the user can operate the transmitter as if he/she is at the site and perform many other diagnostic functions.

RTDS is not designed to be a standalone remote control system. The system is designed to work in association with a standard remote control unit to provide a complete remote control and diagnostic solution for the broadcaster.

The RTDS license allows the software to be installed on as many PCs as desired. This powerful functionality allows a station to create multiple RTDS control/monitoring locations such as the station, a chief engineer's PC, and a general manager's PC. Additional RTDS features include:

- **Windows 95 Program** – The RTDS software is designed for PCs using the Windows 95 operating system. The software can not be used on PCs using the Windows 3.1X. The RTDS license allows a station to install the software on as many PCs as desired.

- **Control Multiple Transmitters At A Site -** The system is designed to control/monitor one or more FM T-Series transmitters at a site. This includes transmitters configured with an analog FX-50/FM-250C exciter or a digital PREDATOR exciter.

- **Transmitter Operating Parameter Warning** – Each transmitter at a site can be assigned minimum/maximum tolerance parameters to operating functions such as output power. When an operating parameter exceeds the minimum/maximum tolerance, the parameter will be highlighted in red on the screen.

- **Security** – Unauthorized access to the transmitter site is prevented by a permission-based security system. A site administrator determines and assigns users to a site. Each user can be assigned the following permissions: 1) readings only, 2) basic control, 3) full control, and 4) administrator. The readings only permission allows a user to view only the controller front-panel screen. The basic control permission allows a user to perform basic transmitter control operations such as transmitter on/off. The full control permission allows a user to perform transmitter control operations and transmitter setup parameters. The administrator can: 1) add/delete/change site users, 2) delete/change site assignments, 3) change transmitter warning setpoints, and 4) control the transmitter.

- **Site Configuration/Communication** – The RTDS software design allows a user to configure and connect to any number of different sites. Each site can be configured independently with the desired transmitter operating parameters and users.

- **Share Telephone Line With Remote Control Unit** – RTDS can share a single telephone line with a dial-up remote control unit. This is accomplished by the installation of a telephone line-sharing device such as the COMSWITCH 5500.

- **Logging** – A log is a collection of transmitter data to be printed or saved to a file. A log can be generated: 1) automatically by configuring RTDS to print/save a log to a printer connected to the transmitter or to a text file at an RTDS PC or 2) manually using the transmitter controller or a transmitter controller screen menu. A log can also be stored in a database file. This allows the data to be manipulated by a spreadsheet program such as Microsoft Excel.

- **Snapshots -** RTDS is equipped with a snapshot system. A snapshot is the capture of transmitter meter and indicator data to a specific file. This file is capable of storing 12 snapshots. The snapshot feature is designed to automatically store one snapshot each month. A snapshot can be captured manually and placed in the file if desired. Snapshots can be viewed: 1) on-line using RTDS when connected to the site, 2) off-line using RTDS when not connected to a site, or 3) saved to a database or text file.

- **Diagnostics** – RTDS is designed with a feature to automatically capture data during a fault event. Fault events are conditions that cause the transmitter to be off-the-air. Fault conditions include: 1) plate overload, 2) grid overload, 3) screen overload, 4) VSWR overload, 5) an exciter AFC unlock condition, 6) a blower failure condition, 7) an open failsafe switch, and 8) an open interlock switch.

- When a fault occurs, the fault event feature will save 7 snapshots. Four snapshots will contain data prior to the fault event. One snapshot will contain data at the fault event. The remaining two snapshots will contain data after the fault event.

- The data can be viewed: 1) on-line using RTDS when connected to the site, 2) off-line using RTDS when not connected to a site, or 3) saved to a database or text file. Once accessed, the data is used by the engineer to determine and correct the cause of the fault condition.

- **Installation** – RTDS can be installed in T-Series transmitters at the factory or in the field. A field installation kit provides the components required to install RTDS in a transmitter already in operation.

APPLICATION – COMMUNICATION SYSTEM.

RTDS is a remote diagnostic system designed to be used to control and monitor Broadcast Electronics T-Series transmitters. The system can be used to control/monitor any number of T-Series transmitters at a site.

Communication between a control location and the transmitter site can be performed using the systems presented in the following text. Depending on the application, communication can be performed using a combination of more than one type of system.

- RTDS Communication - Using a dial-up telephone line.

- RTDS Communication - Using a cellular telephone system.

- RTDS Communication – Using a leased telephone line.

- RTDS Communication – Using a direct connection.

- RTDS Communication - Using an RF system.

RTDS COMMUNICATION - USING A DIAL-UP TELEPHONE LINE.

Communication between an RTDS computer and the transmitter site can be performed using a normal dial-up telephone line. This type of system: 1) uses dial-up modems and a normal telephone line and 2) provides full duplex communication. When contact with the site is required, the RTDS computer is used to dial the site. The transmitter site is not designed with the ability to dial out.

RTDS can be used in transmitter sites equipped with a dial-up remote control system and a single telephone line. This is accomplished using a telephone line-sharing device such as the COMSWITCH model 5500. When a line-sharing device is installed, the device is used to answer the telephone and route the call to the appropriate control system.
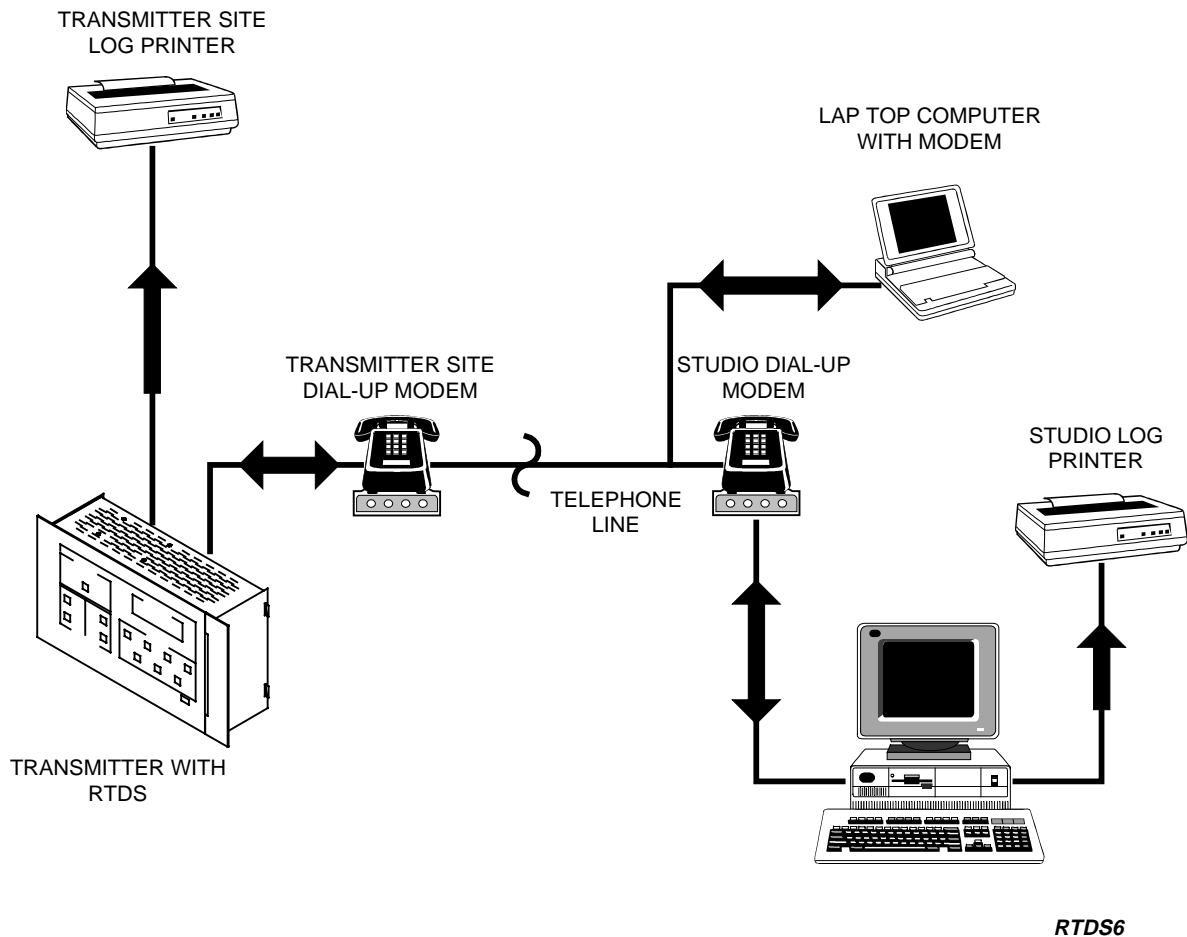
TRANSMITTER SITE
LOG PRINTER

LAP TOP COMPUTER
WITH MODEM

TRANSMITTER SITE
DIAL-UP MODEM

STUDIO DIAL-UP
MODEM

STUDIO LOG
PRINTER

TELEPHONE
LINE

TRANSMITTER WITH
RTDS

RTDS6

RTDS COMMUNICATION – USING A DIAL-UP TELEPHONE LINE

RTDS COMMUNCIATION – USING A LEASED TELEPHONE LINE.

Communication between an RTDS computer and the transmitter site can be performed using a leased telephone line. This type of system: 1) uses 2-wire modems and a leased telephone line and 2) provides full duplex communication. With this type of system, the RTDS computer maintains constant communication with the site.
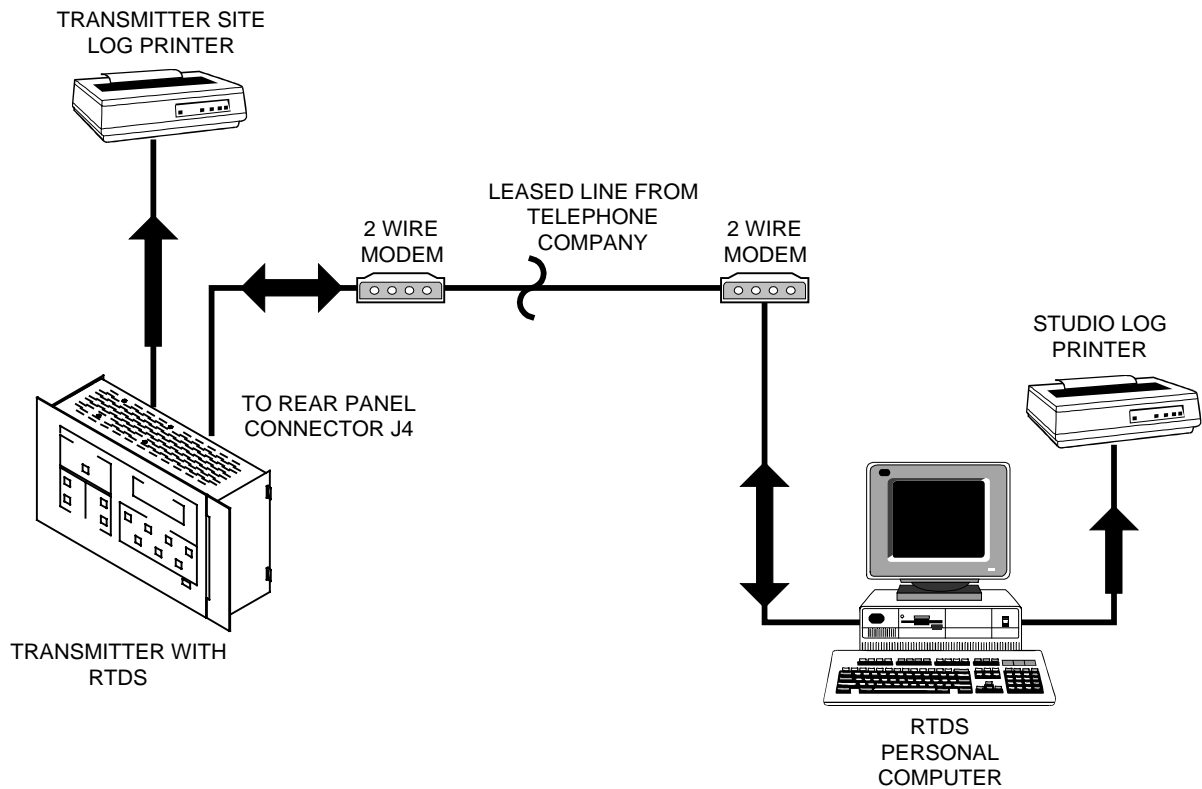
TRANSMITTER SITE
LOG PRINTER

LEASED LINE FROM
TELEPHONE
COMPANY

2 WIRE
MODEM

2 WIRE
MODEM

STUDIO LOG
PRINTER

TO REAR PANEL
CONNECTOR J4

TRANSMITTER WITH
RTDS

RTDS
PERSONAL
COMPUTER

RTDS7

RTDS COMMUNICATION − *USING A LEASED TELEPHONE LINE*

RTDS COMMUNICATION – USING A DIRECT CONNECTION.

Communication between an RTDS computer and the transmitter can be performed by direct connection. Direct connect communication is the connection of an RTDS PC directly to a transmitter local port such as J5 MODEM PORT 2 on the transmitter rear-panel. For occasional use such as a visit to the transmitter site, an RTDS computer can also be connected to MODEM PORT 1 on the transmitter controller front panel.

Typically, a direct connect system is used when the operator is at the transmitter site or the RTDS computer is located within approximately 2000 feet of the transmitter. If the computer is located within 50 feet of the transmitter, copper wire cable can be used to connect the computer to the transmitter. If the computer is located from 50 to 2000 feet from the transmitter, fiber optic cable must be used to connect the computer to the transmitter.

TRANSMITTER SITE
LOG PRINTER

RTDS LAP-TOP
COMPUTER

DIRECT CONNECT
INTERFACE CABLE
(SEE NOTE)

STUDIO LOG
PRINTER

TRANSMITTER WITH
RTDS

NOTE:

1. 50 FT FOR
   COPPER CABLE

2. 2000 FT FOR FIBER
   OPTIC CABLE

RTDS
PERSONAL
COMPUTER

RTDS8

RTDS COMMUNICATION – USING DIRECT CONNECTION

RTDS COMMUNICATION – USING A CELLULAR TELEPHONE SYSTEM.

Communication between an RTDS computer and the transmitter site can be performed using a cellular telephone system. This type of system: 1) uses several pieces of cellular telephone equipment and 2) provides full duplex communication. The control location uses: 1) an RTDS computer with a modem and 2) a cellular telephone. The transmitter site uses a roof-top-mounted cellular antenna, a cellular telephone, and a modem.
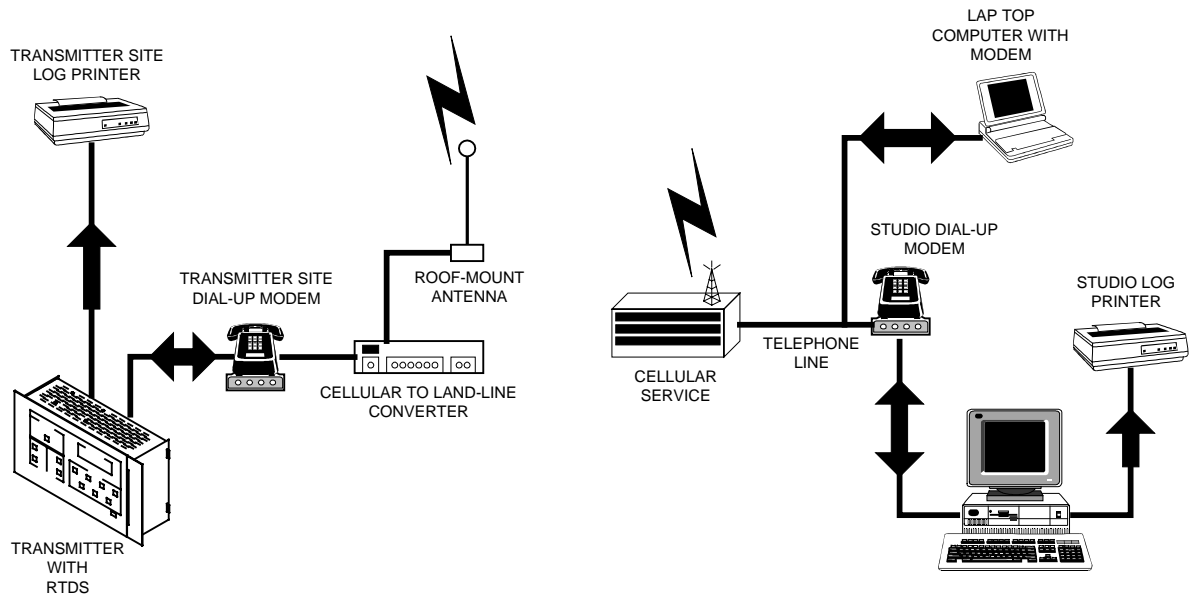
RTDS COMMUNICATION – USING A CELLULAR TELEPHONE SYSTEM

RTDS COMMUNICATION – USING AN RF SYSTEM.

Communication between an RTDS computer and the transmitter site can be performed using an RF system. This type of system uses STL/TSL equipment to provide an RF link between the studio and the transmitter site. Typically, two types of RF systems can be used: 1) a system with a digital STL unit and an analog TSL unit and 2) a system with analog STL and TSL units.

A SYSTEM WITH DIGITAL STL UNITS AND ANALOG TSL UNITS.

When an RF system is created using digital STL units such as the Broadcast Electronics DSTL DP5503A transmitter and the DP5504 receiver, communication to the transmitter site is provided by the digital STL units. This is accomplished by connecting the computer to the RS-232 data input port on the DP 5503A.

STUDIO LOG
PRINTER

DP5504
DSTL RECEIVER

DP5503A
DSTL TRANSMITTER

TRANSMITTER SITE
LOG PRINTER

STL-10 STL
TRANSMITTER

R-10 STL
RECEIVER

4 WIRE
MODEM

RTDS STUDIO
PERSONAL
COMPUTER

4 WIRE
MODEM

SCG-10
SUBCARRIER
GENERATOR

SCD-10 SUBCARRIER
DEMODULATOR

TRANSMITTER WITH
RTDS
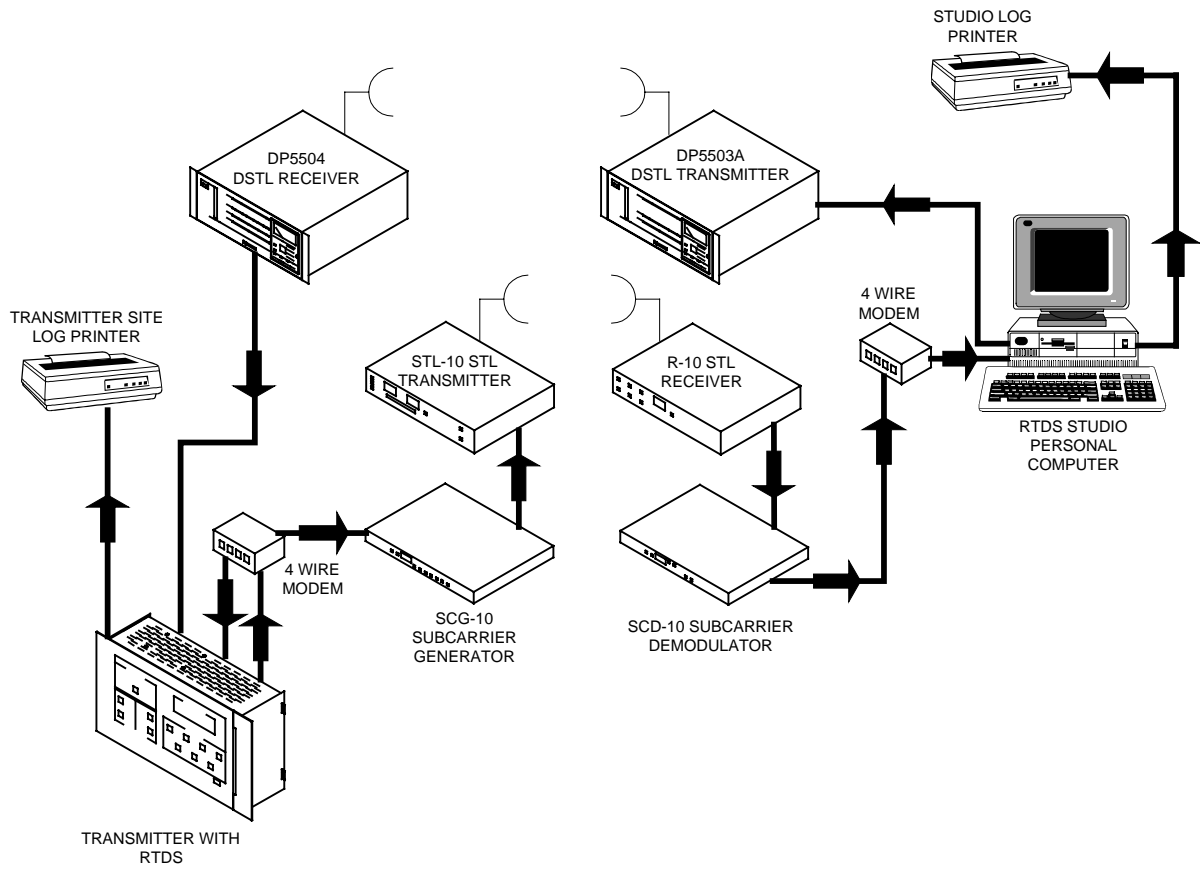
RTDS9

RF COMMUNICATION – SYSTEM WITH DIGITAL STL UNITS AND ANALOG TSL UNITS

Communication from the transmitter to the studio is provided by an analog TSL system consisting of a 4-wire modem, a Broadcast Electronics Marti STL-10 STL transmitter, and a Broadcast Electronics Marti SCG-10 subcarrier generator. Digital information from the transmitter is converted to an analog format by a 4-wire modem and applied to the subcarrier generator. The subcarrier generator output is applied to the STL transmitter for transmission to the studio. The information is received by a Broadcast Electronics Marti R-10 receiver and decoded by a Broadcast Electronics Marti SCD-10 subcarrier demodulator. The 4-wire modem converts the analog signal to a digital format for application to the RTDS computer

A SYSTEM WITH ANALOG STL AND TSL UNITS.

An RF system can be created using analog STL/TSL units. An STL system created using a Broadcast Electronics Marti STL-10 transmitter, an SCG-10 subcarrier generator, an R-10 Receiver, and an SCD-10 subcarrier decoder provides communication from the studio to the transmitter site. An identical system created with the same components provides communication from the transmitter site to the studio. 4-wire modems are used to convert analog information into a digital format.

13
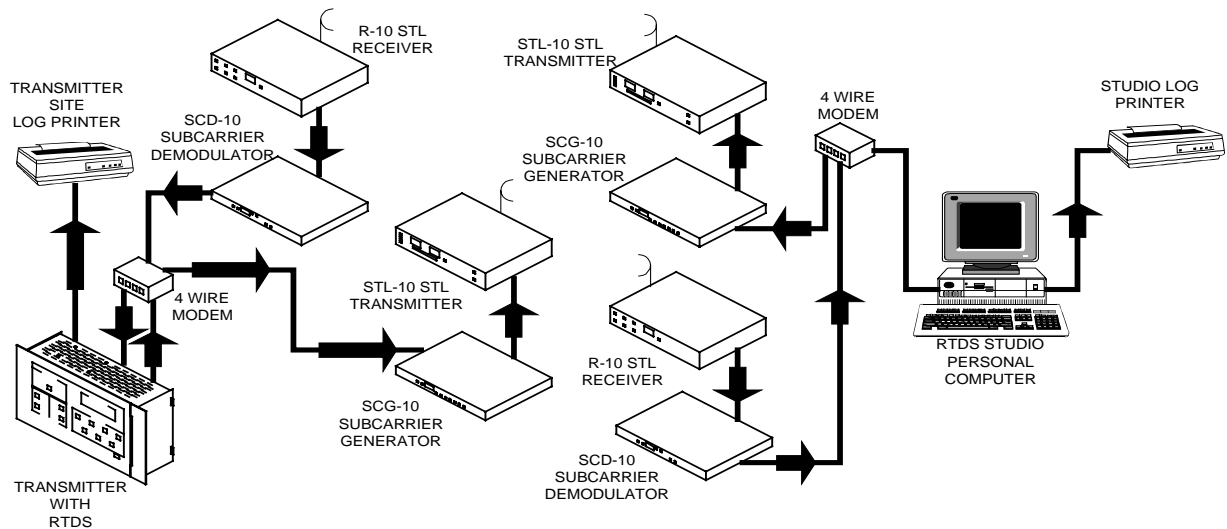
RTDS10

RF COMMUNICATION – SYSTEM WITH ANALOG STL AND TSL UNITS

HELPFILE - RTDS.

The RTDS helpfile contains detailed information on RTDS installation and operating procedures. The helpfile can be viewed prior to installing the RTDS software. This allows the user to become familiar with the RTDS terms and functionality.

➢ To view the RTDS helpfile prior to installing the RTDS software, proceed as follows:

1. Insert the RTDS CD ROM in the PC CD ROM drive. The setup program will automatically begin. If the setup program is to be started manually, proceed as follows:

    A. Double-click the **My Computer** shortcut on the Windows 95 desktop.

    B. Double-click the CD ROM drive.

    C. Double-click the *SETUP.EXE* file in the E:\RTDS directory (E: is the CD ROM drive letter).

    The setup program will begin.

2. Select the **VIEW RTDS HELPFILES** option from the setup menu.

3. Follow the on-screen prompts to view the helpfile.

When helpfile is closed, the setup program will return.

4. Select the **EXIT THIS PROGRAM** option and the **NEXT** button to exit the setup program.

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BEI CUSTOMER SERVICE DEPARTMENT.

If a question or a problem is encountered during the installation or use of RTDS, contact the Broadcast Electronics RF Customer Service Department. The RF Service Department can provide technical assistance on RTDS installation, operation, and troubleshooting procedures.

The Service Department can also provide emergency and warranty replacement parts for equipment. If parts are required, ensure the equipment model number, serial number, part description, and part number are included with the request.

RF PRODUCT CUSTOMER SERVICE CONTACTS -

Telephone: (217) 224-9617 (8 AM to 5 PM Central Time)
            (217) 224-9600 (During Non-Business Hours)
E-Mail: rfservice@bdcast.com
Fax: (217) 224-9607

NON-EMERGENCY REPLACEMENT PARTS -

Non-emergency replacement parts may be ordered directly from the Broadcast Electronics stock room by fax at the number shown below.

Fax: (217) 224-9609

BROADCAST ELECTRONICS FACILITY CONTACTS -

Broadcast Electronics, Inc. - Quincy Facility
4100 N. 24th St. P.O. BOX 3606
Quincy, Illinois 62305
Telephone: (217) 224-9600
Fax: (217) 224-9607
E-Mail: General - bdcast@bdcast.com
Web Site: www.bdcast.com

RETURN OF EQUIPMENT FOR REPAIR.

Prior to returning any equipment for repair or exchange, contact the RF Customer Service Department for a Return Authorization. Do not return any merchandise without our written approval. We will provide special shipping instructions and a code number that will assure proper handling and prompt issuance of credit. Please furnish complete details as to circumstances and reasons when requesting return of merchandise.

Equipment requiring repair or overhaul should be sent by common carrier, prepaid, insured, and well protected. If proper shipping materials are not available, contact the Customer Service Department for a shipping container. Do not mail the equipment. We can assume no liability for inbound damage, and necessary repairs become the obligation of the shipper.

WARRANTY/REGISTRATION CARD.

The RTDS warranty/registration card is presented below. Complete and return the card to the address shown below following RTDS installation. If RTDS is not registered, free upgrades will **NOT** be provided.

IBE *RTDS WARRANTY/REGISTRATION CARD*

Station - _____ Purchase Date _____

Address -
  Street _____ Box No. _____

  City/Town _____ State _____

  Zip Code _____ Country _____

Primary Contact Person _____

Office Telephone Number _____-_____-_____

Transmitter Site Telephone Number _____-_____-_____

Software Version _____

Firmware Version _____

RTDS73

RTDS WARRANTY/REGISTRATION CARD

Return card to:

Broadcast Electronics, Inc. - Quincy Facility
4100 N. 24th St. P.O. BOX 3606
Quincy, Illinois 62305

Attention: RF Customer Service Department

INSTALLATION

FIELD INSTALLATION.

RTDS can be purchased and installed in a T-Series transmitter already in service. The field installation kit includes an RTDS microprocessor module. The RTDS module replaces the existing module in the transmitter. When the new module is installed, keep the old module in a safe location such as the bottom shelf in the controller unit chassis. The old module can be used to operate the transmitter in the event of a failure in the RTDS module.

The RTDS installation procedures are determined by the desired communication system to be installed. The types of RTDS communication systems include: 1) dial-up telephone line, 2) leased telephone line, 3) cellular telephone, 4) RF, and 5) direct connection. Prior to performing any installation procedures, refer to Application – Communication System and determine the type of system to be installed. Once a specific system is determined, refer to the following text to install RTDS using a field installation kit.

1. Select the PCs to be equipped with RTDS. Ensure each PC meets the minimum hardware requirements for RTDS (refer to Computer – System Requirements).

2. Install the software on a PC.

3. Record the transmitter overload values.

4. Install the RTDS microprocessor module.

5. Check the controller EMI filter circuit board revision.

6. Perform the controller hardware test.

7. Download the RTDS program into the microprocessor module. This is performed using the Field Installation – Download Firmware procedure.

8. Install the RTDS communication system.

9. Connect to the transmitter using Modem Port 1.

10. Calibrate the RTDS transmitter meters.

11. Enter the transmitter overload and timeout values in RTDS.

12. Assign users to the site.

13. Perform the Fast/Normal restart programming.

FACTORY INSTALLATION.

RTDS can be purchased and installed in a T-Series transmitter at the factory. With a factory-installed system, the factory technicians perform many of the installation and setup procedures.

The specific RTDS installation procedures are determined by the desired communication system to be installed. The types of RTDS communication systems include: 1) dial-up telephone line, 2) leased telephone line, 3) cellular telephone, 4) RF, and 5) direct connection. Prior to performing any installation procedures, refer to Application – Communication System and determine the type of system to be installed. Once a specific system is determined, refer to the following text to complete an RTDS installation at a site with a factory-installed system.

1. Select the PCs to be equipped with RTDS. Ensure each PC meets the minimum hardware requirements for RTDS (refer to Computer – System Requirements).

2. Install the software on a PC.

3. RTDS communication system connections.

4. Connect to the transmitter using Modem Port 1.

5. Assign users to the site.

6. Perform the Fast/Normal restart programming.

COMPUTER - SYSTEM REQUIREMENTS.

The RTDS software can be installed on an unlimited number of PCs. The type of communication system determines the number, location, and connection of RTDS PCs to the transmitter site. Typically, the RTDS software will be installed: 1) on an engineers laptop PC, 2) a PC at the transmitter site if a laptop is not available, and 3) a minimum of one PC at the studio. A PC equipped with RTDS is typically used at the transmitter site during a field installation. The following text presents the minimum PC system requirements for the RTDS software. Ensure each PC meets the following requirements prior to performing the RTDS software installation procedures.

- 486 66 MHz PC.

- 16 MB of RAM.

- 15 MB of hard disk space.

- Microsoft Windows 95.

- VGA or better video display.

- Mouse.

- CD-ROM for installation.

INSTALLING THE RTDS SOFTWARE.

The RTDS CD is equipped with the RTDS software, the RTDS firmware, on-line T-Series transmitter manuals, the Adobe Acrobat Reader program to view the manuals, and an autorun feature. The autorun feature automatically starts the RTDS setup program when the CD is inserted into the CD ROM drive. The setup program allows the user to perform the following tasks.

Install RTDS to a hard disk.

- View the RTDS helpfiles.

- View a transmitter instruction book (requires Acrobat Reader).

- Copy a transmitter instruction book to a hard disk.

- Install the Acrobat Reader to a hard disk.

18

- Exit the program.

➢ To install the RTDS software, proceed as follows:

1. Terminate all current Windows 95 applications.

2. Insert the RTDS CD ROM in the PC CD ROM drive. The setup program will automatically begin. If the setup program is to be started manually, proceed as follows:

    A. Double-click the **My Computer** shortcut on the Windows 95 desktop.

    B. Double-click the CD ROM drive.

    C. Double-click the *SETUP.EXE* file in the E:\RTDS directory (E: is the CD ROM drive letter).

    The setup program will begin.

3. Select the **INSTALL RTDS TO HARD DISK** option and follow the on-screen prompts to install the software. For first-time installations, the PC must be rebooted prior to using RTDS. When the "Restart the Computer" option appears, select NO to reboot the computer at a later time or YES to reboot the computer immediately.

The RTDS program will be installed. If the default location is selected, the RTDS program will be installed in the C:\PROGRAM FILES subdirectory. When finished, the setup program will return to the setup option page.

4. Select the **EXIT THIS PROGRAM** and the **NEXT** button to exit the setup program.

RECORD THE TRANSMITTER OVERLOAD VALUES.

Prior to installing the RTDS microprocessor module, the transmitter overload and timeout values must be recorded. Once recorded, the values must be entered into RTDS.

➢ To record the transmitter overload and timeout values, proceed as follows:

1. Connect the PC to the front-panel **MODEM PORT 1** receptacle using a null modem cable.

2. RTDS uses the Windows 95 Hyperterminal program to communicate with the transmitter. To help in the operation of Hyperterminal, the RTDS *SETUP.EXE* program placed a Hyperterminal icon the PC desktop. This icon is pre-configured with the following parameters: 1) the COM1 port for connection to the transmitter, 2) Baud Rate – 9600, 3) Data Bits – 8, 4) Parity – None, 5) Stop Bits – 1, and 6) Flow Control – None. Start the program by double-clicking the Hyperterminal icon on the PC desktop.

The Hyperterminal program will start and connect to the transmitter.

3. Depress any key on the keyboard.

The transmitter overload and timeout values will appear.

4. Print or record the information.

5. Repeat the procedure for each RTDS transmitter at the site.

6. Enter the values in the RTDS overload/timeout tab page (refer to Overload/Timeout Setup). Enter the values immediately following the initial connection to the transmitter.

INSTALLING THE RTDS MICROPROCESSOR MODULE.

WARNING   DISCONNECT ALL TRANSMITTER PRIMARY POWER BEFORE PROCEEDING.

---

1. Disconnect all transmitter primary power.

2. Open the controller front door.

3. Locate the controller microprocessor module.

CONTROLLER MICROPROCESSOR
SMART CORE CIRCUIT BOARD

919-0436 CONTROLLER
MAIN CIRCUIT BOARD

SOME COMPONENTS
NOT SHOWN FOR
CLARITY
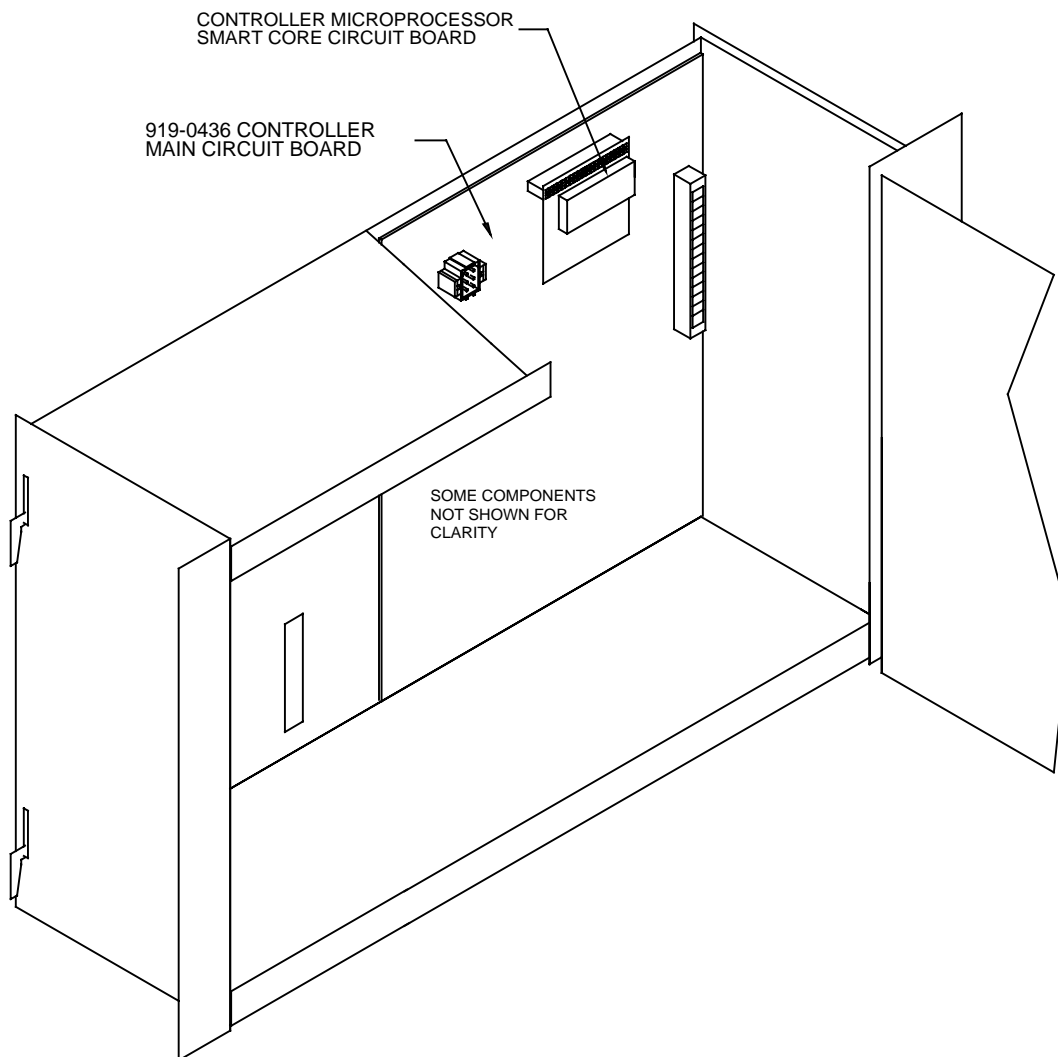
RTDS5

MICROPROCESSOR MODULE LOCATION

4. Remove the old non-RTDS module as follows:

    A. Remove the mounting screw.

    B. Remove the module from the main circuit board.

C. Place the old module in the bag provided with the new RTDS microprocessor module. Place the bag in the controller chassis. In the event of a problem with the RTDS microprocessor module, the old non-RTDS module can be used as an emergency backup.

5. Install the RTDS microprocessor module as follows:

    A. Locate the RTDS microprocessor module.

    B. Orient the microprocessor as shown.

    C. Firmly insert the module connector into the header.

    D. Replace the mounting screw.

6. Close the controller front door.

CHECKING THE CONTROLLER EMI FILTER PCB REVISION.


WARNING   DISCONNECT ALL TRANSMITTER PRIMARY POWER BEFORE PROCEEDING.

---

1. Disconnect all transmitter primary power.

2. Open the controller front door.

3. Locate the EMI filter circuit board and the revision level label.

4. If the EMI filter circuit board is REV C or greater, no modifications are required.

5. If the EMI filter circuit board is prior to REV C (REV A or REV B), Resistors R34 and R76 must be changed. Modify the circuit board as follows:

    A. Remove the EMI filter circuit board from the controller chassis as follows:

        1. On the controller rear-panel, disconnect the cables connected to **J1 REMOTE I/O, J2 LOCAL I/O,** and **J3 LOCAL I/O**.

        2. On the controller rear-panel, remove the connector locking hardware on **J3 LOCAL I/O, J2 LOCAL I/O, J5 MODEM PORT 2, J1 REMOTE I/O, J6 LOCAL PORT**, and **J7 PRINTER**.

        3. Inside the controller chassis, disconnect the P11/P3 and P12/P4 ribbon cables.

        4. Inside the controller chassis, disconnect BNC connectors P9 and P10.

        5. Remove the circuit board from the chassis.

REVISION
LABEL

P9

P10

REV. C

919-0438
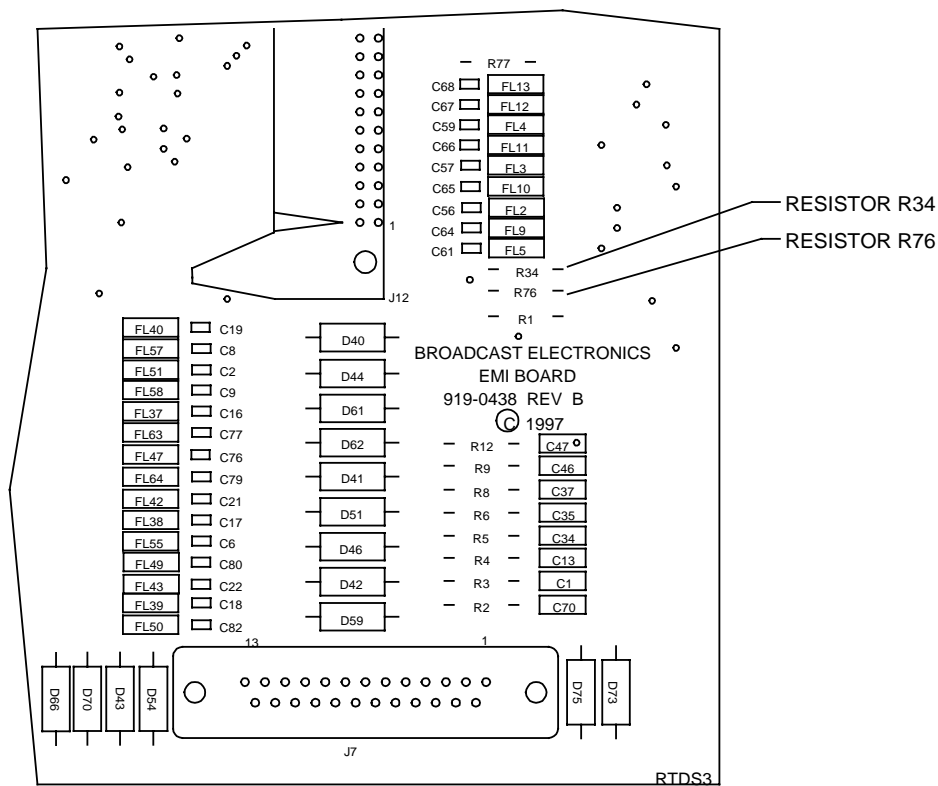CONTROLLER EMI
FILTER CIRCUIT
BOARD
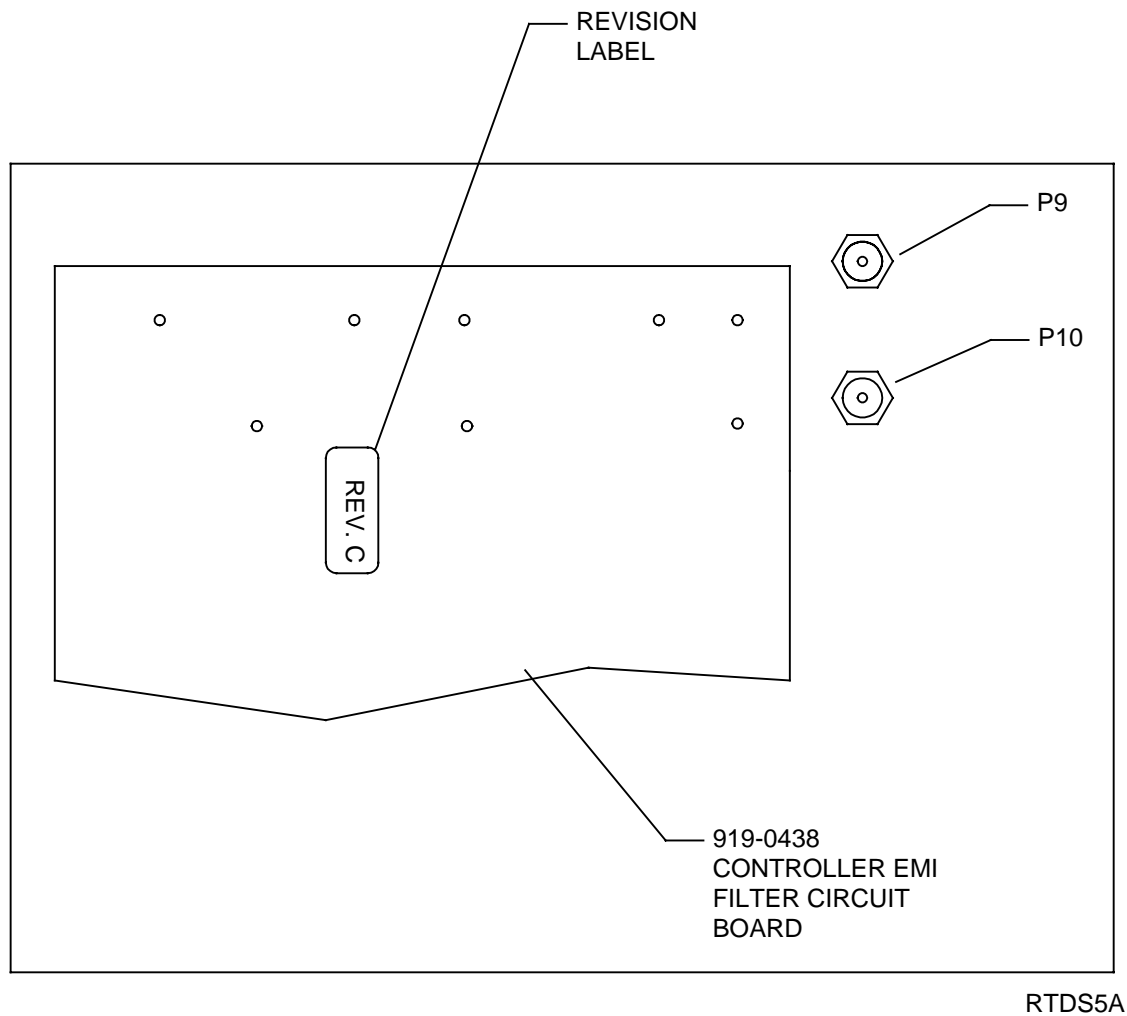
RTDS5A

RTDS5A

EMI FILTER CIRCUIT BOARD REVISION LABEL LOCATION
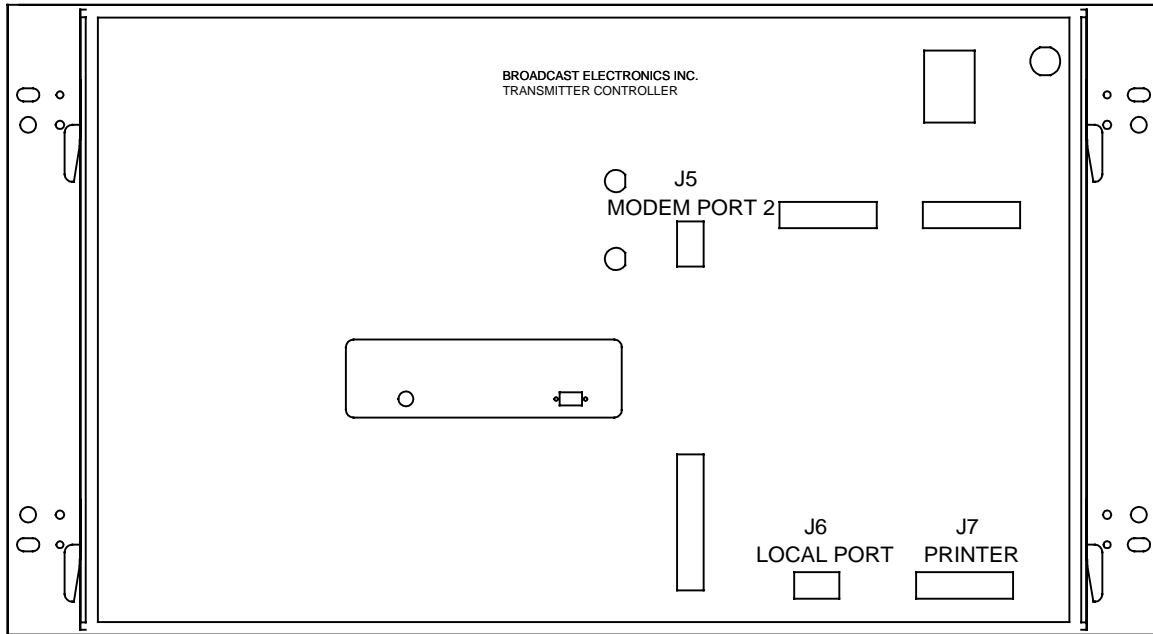
RTDS4

T-SERIES CONTROLLER REAR-PANEL

B. Locate resistors R34 and R76 on the EMI filter circuit board.

RTDS3

R34/R76 LOCATION ON EMI FILTER CIRCUIT BOARD

C. Using a pair of side-cutters and a low-wattage soldering iron, remove resistors R34 and R76.

D. Locate the 51.1 Ohm resistors in the RTDS installation kit.

E. Install the 51.1 Ohm ±1%, ¼ Watt resistors in the R34 and R76 locations.

F. Once the resistors are installed, replace the EMI filter circuit board in the chassis by reversing the preceding procedure.

6. Close the controller front door.

CONTROLLER HARDWARE TEST.

Once the RTDS microprocessor module is installed in the transmitter controller, the controller hardware must be tested. This is accomplished using a port test program loaded into the module. This ensures the controller hardware is operating properly prior to the installation of the RTDS program. The controller hardware test consists of connecting a PC to the transmitter controller front-panel **MODEM PORT 1** connector using the null modem cable supplied with the field installation kit. Once the PC is connected, a test program is executed to check the controller ports.

➢ To check the controller hardware, proceed as follows:

1. Test the printer port as follows:

A. Connect a printer to the **J7 PRINTER** port on the controller.
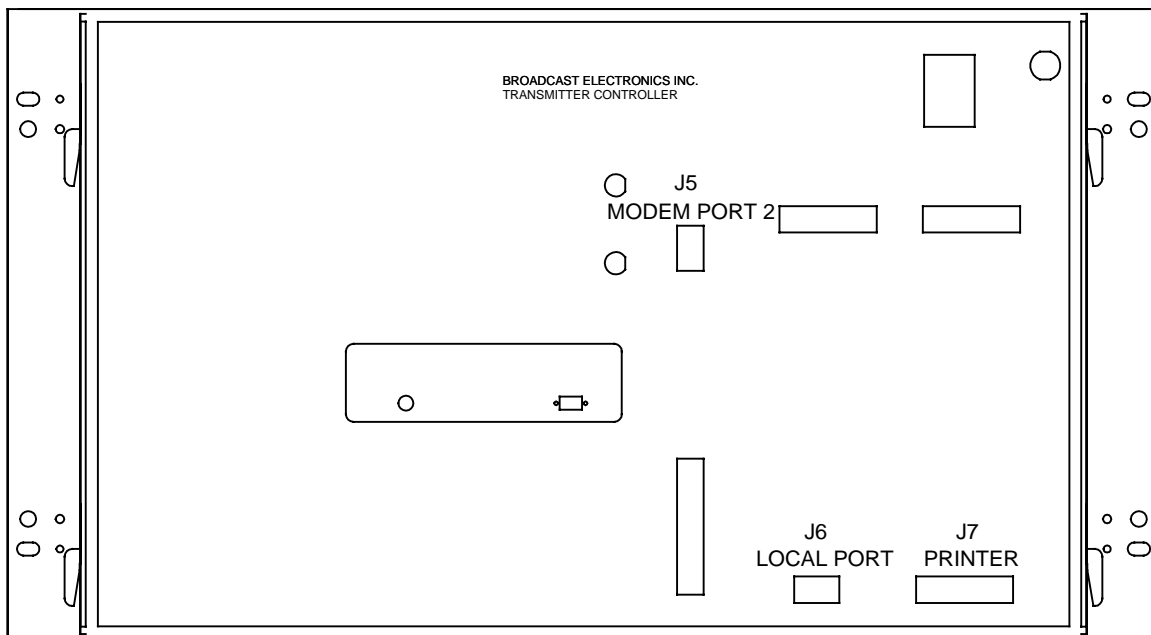
RTDS4

T-SERIES CONTROLLERREAR-PANEL

B. Depress the controller HIGH VOLTAGE OFF switch/indicator.

The printer will print the port test form.

24

```
Form: PORTTEST   revision A.   7-10-98

This is a test of the logging printer.  Please attach to the test data sheet.
Use with the EPROM called PORTTEST.C or download the module PORTTEST.DLP.


Transmitter model_____


Transmitter serial number_____


Front panel COM port 1 data I/O OK _____


Front panel modem port 1 carrier detect OK _____


Rear panel modem port 2 data I/O OK _____


Rear panel modem port 2 carrier detect OK _____


Rear panel local port 3 data I/O OK _____


Modem 2 configuration jumper OK _____
```

RTDS68

PORT TEST FORM

2. Test port 1 as follows:

   A. Ensure jumper P8G on the controller main circuit board is installed.
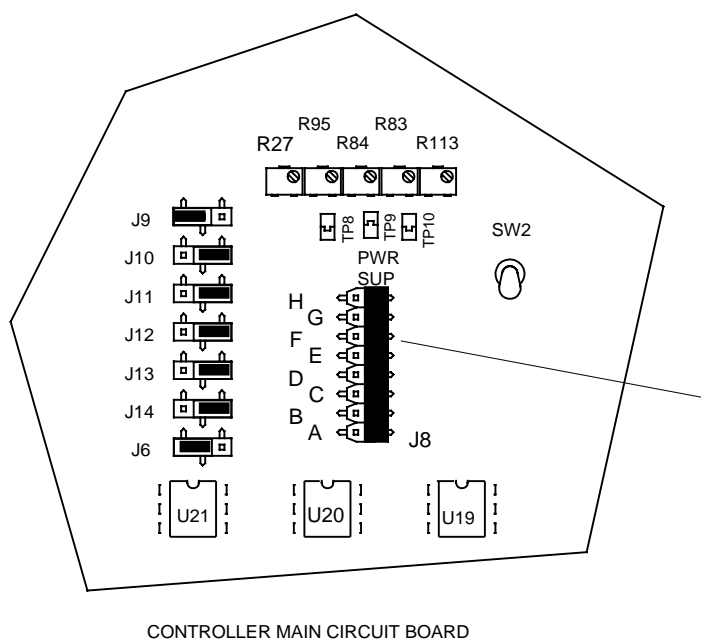
JUMPER P8G -
1. WHEN P8G IS INSTALLED:
    A. J5 MODEM PORT 2 IS CONFIGURED FOR
       MODEM OPERATION.
    B. LOGIN SECURITY SYSTEM IS ACTIVE.
    C. FRONT-PANEL MODEM PORT 1 IS
       ENABLED IF NO USER IS LOGGED INTO
       J5 MODEM PORT 2.
2. WHEN P8G IS REMOVED:
    A. J5 MODEM PORT 2 IS CONFIGURED FOR
       LOCAL OPERATION.
    B. LOGIN SECURITY SYSTEM IS DISABLED.
    C. FRONT-PANEL MODEM PORT 1 IS
       DISABLED.

CONTROLLER MAIN CIRCUIT BOARD

RTDS16

JUMPER P8G LOCATION ON CONTROLLER MAIN CIRCUIT BOARD

   B. Connect the null modem cable between a COM port on the PC and **MODEM PORT 1** on
   the transmitter controller.

25
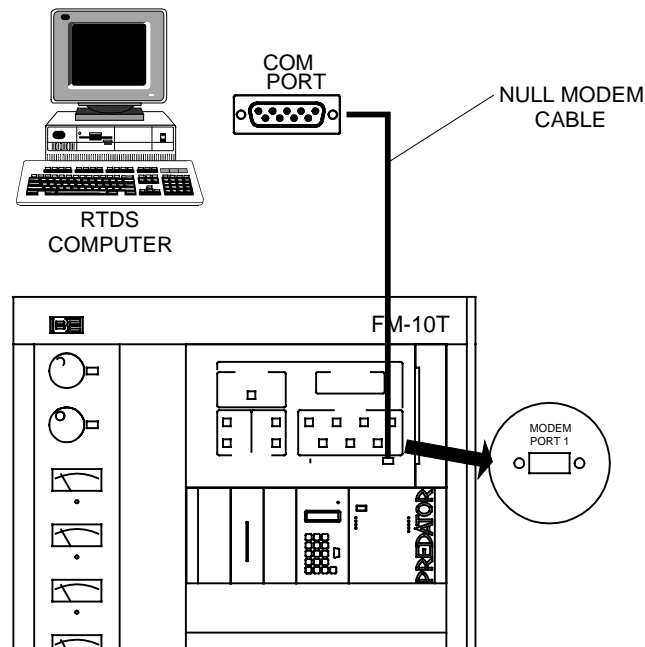
FRONT PANEL PORT CONNECTION - OCCASIONAL USE

CONNECTIONS – MODEM PORT 1

C. RTDS uses the Windows 95 Hyperterminal program to communicate with the transmitter. To help in the operation of Hyperterminal, the RTDS *SETUP.EXE* program placed a Hyperterminal icon the PC desktop. This icon is pre-configured with the following parameters: 1) the COM1 port for connection to the transmitter, 2) Baud Rate – 9600, 3) Data Bits – 8, 4) Parity – None, 5) Stop Bits – 1, and 6) Flow Control – None. Start the program by double-clicking the Hyperterminal icon on the PC desktop.

The Hyperterminal program will start and connect to the transmitter. The controller PRESET switch/indicator will illuminate.

D. Depress the **PRESET** switch/indicator.

The following message will appear on the monitor.
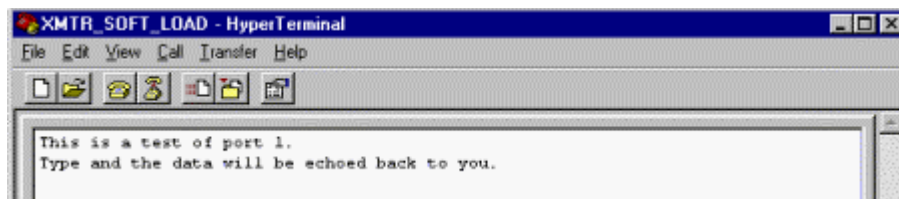
PORT 1 TEST

E. Using the keyboard, enter the following: TEST 1.

F. Ensure TEST 1 appears on the monitor.

3. Test Port 2 as follows:

    A. Move the cable from the front-panel **MODEM PORT 1** receptacle to the **J5 MODEM PORT 2** receptacle on the controller rear-panel.

    The controller PRESET switch/indicator will extinguish and the REMOTE DISABLE switch/indicator will illuminate.

    B. Depress the **REMOTE DISABLE** switch/indicator.

    The following message will appear on the monitor.

RTDS52

PORT 2 TEST

    C. Using the keyboard, enter the following: TEST 2.

    D. Ensure TEST 2 appears on the monitor.

4. Test Port 3 as follows:

    A. Move the cable from the **J5 MODEM PORT 2** receptacle to the **J6 LOCAL PORT** receptacle on the controller rear-panel.

    The controller REMOTE DISABLE switch/indicator will extinguish and the APC ON switch/indicator will illuminate.

    B. Remove jumper P8G on the controller main circuit board assembly.

    The controller APC ON switch/indicator will extinguish.

    C. Re-install jumper P8G on the controller main circuit board assembly.

    The controller APC ON switch/indicator will illuminate.

    D. Depress the **APC ON** switch/indicator.

    The following message will appear on the monitor.

RTDS53

PORT 3 TEST

E. Using the keyboard, enter the following: TEST 3.
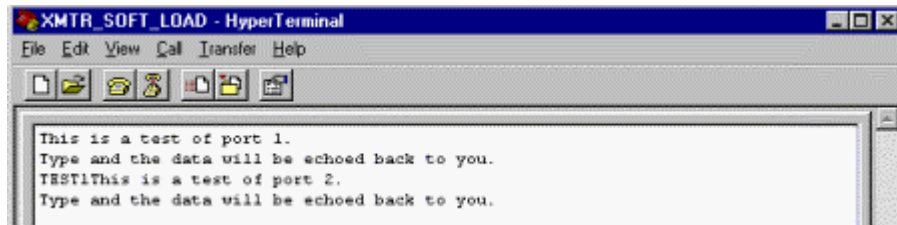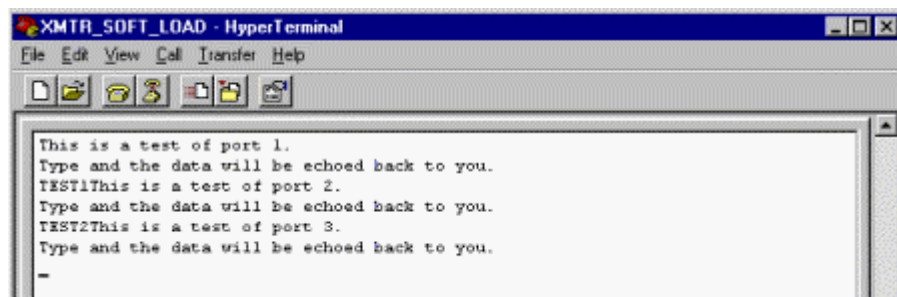
F. Ensure TEST 3 appears on the monitor.

5. Disconnect the cable from the **J6 LOCAL PORT** receptacle.

6. If the printer, port 1, port 2, or port 3 test fails, the controller hardware must be replaced. Contact the Broadcast Electronics Customer Service Department to replace the hardware.
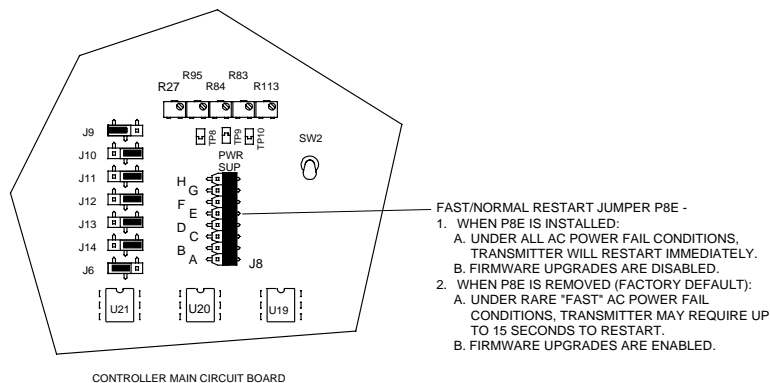
FIELD INSTALLATION - DOWNLOAD FIRMWARE.

Downloading the firmware consists of loading the RTDS code in the flash memory. The firmware is loaded using any terminal program such as Windows 95 Hyperterminal. The following text presents the procedure to load the firmware using Hyperterminal.

➢ To download the firmware, proceed as follows:

CAUTION	TO PREVENT POSSIBLE DAMAGE TO THE TRANSMITTER DURING THE START-UP OF THE NEW FIRMWARE, OPERATE THE TRANSMITTER HIGH VOLTAGE CIRCUIT BREAKER TO OFF.

1. Operate the transmitter HIGH VOLTAGE circuit breaker to OFF.

2. Check the position of jumper P8E on the controller main circuit board. The jumper must be removed to enable firmware downloads.

CONTROLLER MAIN CIRCUIT BOARD

FAST/NORMAL RESTART JUMPER P8E -
1. WHEN P8E IS INSTALLED:
   A. UNDER ALL AC POWER FAIL CONDITIONS, TRANSMITTER WILL RESTART IMMEDIATELY.
   B. FIRMWARE UPGRADES ARE DISABLED.
2. WHEN P8E IS REMOVED (FACTORY DEFAULT):
   A. UNDER RARE "FAST" AC POWER FAIL CONDITIONS, TRANSMITTER MAY REQUIRE UP TO 15 SECONDS TO RESTART.
   B. FIRMWARE UPGRADES ARE ENABLED.

RTDS78

***FAST/NORMAL RESTART JUMPER P8E LOCATION ON
CONTROLLER MAIN CIRCUIT BOARD***

3. Connect the PC to **J5 MODEM PORT 2** on the transmitter controller rear-panel using a null modem cable.

4. RTDS uses the Windows 95 Hyperterminal program to communicate with the transmitter. To help in the operation of Hyperterminal, the RTDS *SETUP.EXE* program placed a Hyperterminal icon the PC desktop. This icon is pre-configured with the following parameters: 1) the COM1 port for connection to the transmitter, 2) Baud Rate – 9600, 3) Data Bits – 8, 4) Parity – None, 5) Stop Bits – 1, and 6) Flow Control – None. Start the program by double-clicking the Hyperterminal icon on the PC desktop.

The Hyperterminal program will start and connect to the transmitter.

5. Depress the controller microprocessor reset switch.
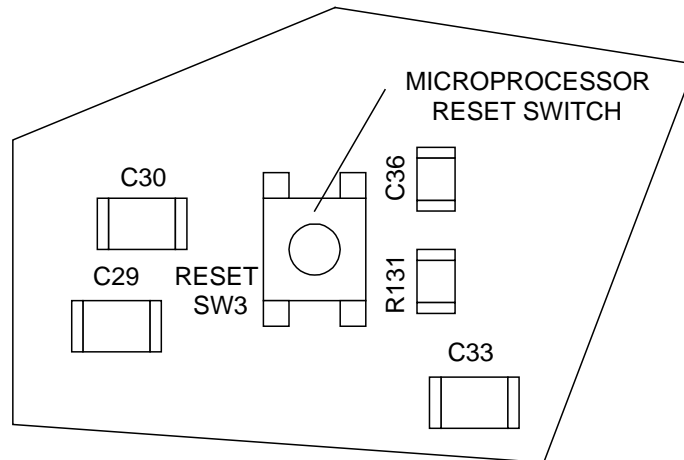
CONTROLLER MICROPROCESSOR RESET SWITCH

The download manager menu will appear.
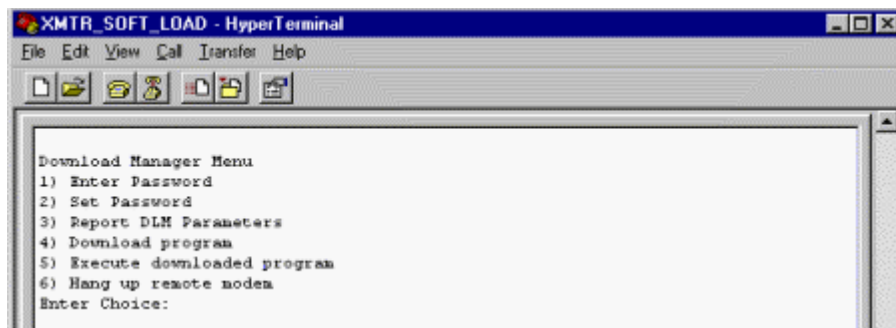
DOWNLOAD MANAGER

NOTE   PERFORM THE FOLLOWING COMMAND WITHIN 20 SECONDS OF
THE PREVIOUS STEP OR THE PROGRAM WILL TERMINATE.

---

6. Enter: **1**.

7. Depress **ENTER**.

8. Start the download process as follows:

NOTE   PERFORM THE FOLLOWING STEPS IN A TIMELY MANNER TO
PREVENT PROGRAM TERMINATATION.

A. Insert the RTDS CD in the computer CD ROM drive.

B. Enter: **4**.

DOWNLOAD MANAGER – SEND FILE

C. In Hyperterminal, click **TRANSFER**.

D. Click **SEND FILE**.

The send file dialog box will appear.

E. In the Protocol dialog box, select: **XMODEM**.

F. Using the send file dialog box, select the ***FMC_V3.DLP*** file in the E:\DOWNLOAD directory (E: is the CD ROM drive letter).

G. Click **SEND**.

The file will be transferred.

9. When the download process has finished, enter: **5**.

The controller program will start.

RTDS COMMUNICATION SYSTEM CONNECTIONS.

Transmitter site and studio/control location RTDS connections are determined by the selected communication system. RTDS communication system applications consist of using a: 1) dial-up telephone line, 2) leased telephone line, 3) cellular telephone system, 4) RF system, and 5) direct connection. For applications where an RTDS is to share a single dial-up telephone line with a remote control system, the installation of a telephone line-sharing device will be required. The following text presents the procedures to install and connect equipment at the transmitter site and the studio/control location.

- Using A Dial-Up Telephone Line.

- Using A Leased Telephone Line.

- Using A Direct Connection.

- Using A Cellular Telephone System.

- Using An RF System.

System connections are also determined by the number of RTDS transmitters at a site. RTDS is designed with the ability to access up to 26 devices at a site. A device is defined as : 1) an RTDS equipped transmitter or 2) a Broadcast Electronics PREDATOR digital exciter. Communication to each individual device is performed by the connection of null modem interface cables in a "daisy chain" configuration.
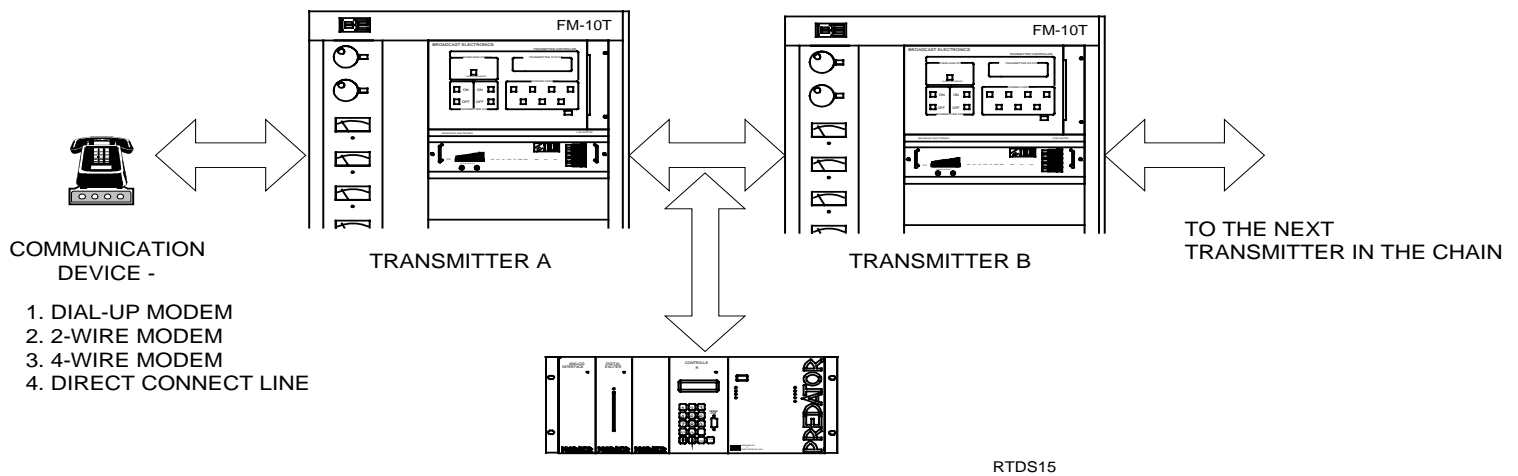
RTDS15

"DAISY CHAIN" CONNECTIONS

In addition to the connection of cables, a jumper on the controller main circuit board must be placed in the appropriate position for the type of communication system to be installed. Jumper P8G on the controller main circuit board controls the operation of J5 MODEM PORT 2 on the controller rear-panel. When P8G is installed: 1) J5 MODEM PORT 2 is configured for modem operation, 2) the login security system is active, and 3) front-panel MODEM PORT 1 is enabled if no user is logged into J5 MODEM PORT 2. When P8G is removed: 1) J5 MODEM PORT 2 is configured for local operation, 2) the login security system is disabled, and 3) front-panel MODEM PORT 1 is disabled.
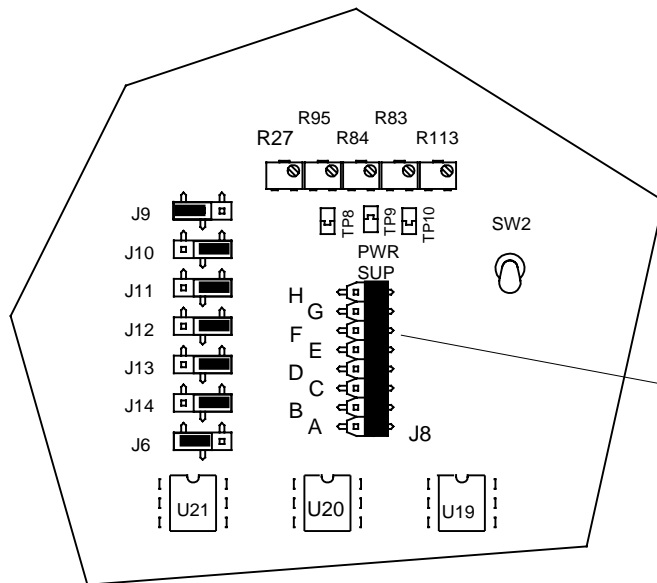
JUMPER P8G -
1. WHEN P8G IS INSTALLED:
   A. J5 MODEM PORT 2 IS CONFIGURED FOR MODEM OPERATION.
   B. LOGIN SECURITY SYSTEM IS ACTIVE.
   C. FRONT-PANEL MODEM PORT 1 IS ENABLED IF NO USER IS LOGGED INTO J5 MODEM PORT 2.
2. WHEN P8G IS REMOVED:
   A. J5 MODEM PORT 2 IS CONFIGURED FOR LOCAL OPERATION.
   B. LOGIN SECURITY SYSTEM IS DISABLED.
   C. FRONT-PANEL MODEM PORT 1 IS DISABLED.

CONTROLLER MAIN CIRCUIT BOARD

RTDS16

JUMPER P8G LOCATION ON CONTROLLER MAIN CIRCUIT BOARD

CONNECTIONS – DIAL-UP TELEPHONE LINE SYSTEM.

The installation of a dial-up telephone line system requires the installation of a dial-up modem at the transmitter site and in the RTDS PC. If the site is equipped with a dial-up remote control system and a single telephone line, a telephone line-sharing device must be installed. The following text presents the procedures to install a dial-up telephone line system and connect a log printer to the transmitter.

32

RTDS6
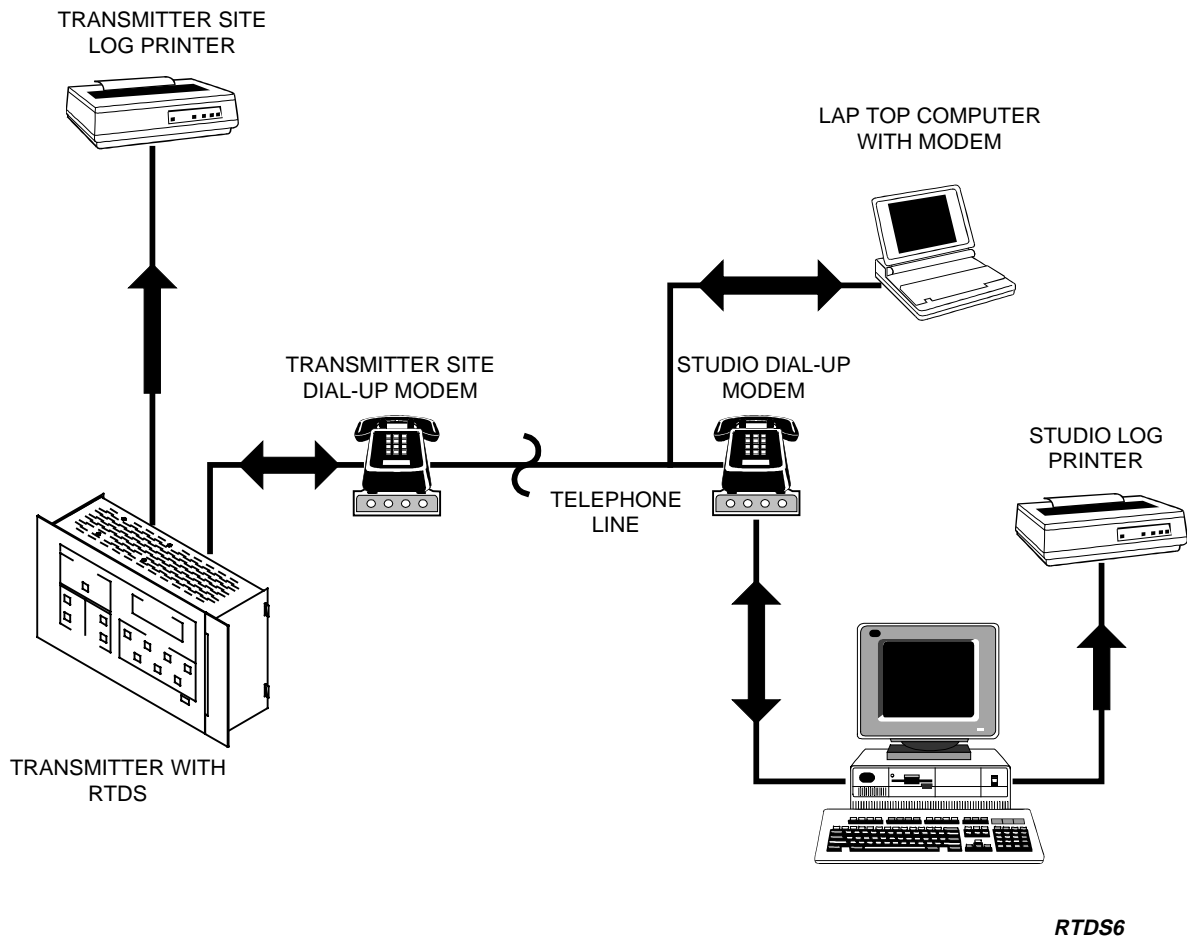
RTDS COMMUNICATION – USING A DIAL-UP TELEPHONE LINE

INSTALL A TELEPHONE LINE PROTECTION DEVICE.

It is strongly recommended the transmitter site and control locations be equipped with telephone line protection devices. This will prevent damage to the modems from surges/spikes such as lightning on the telephone line.

• Telephone Line Protection.

INSTALL THE TRANSMITTER SITE DIAL-UP MODEM.

The transmitter site will require the installation of an external dial-up modem. RTDS is designed with the ability to use almost any external modem available on the market.
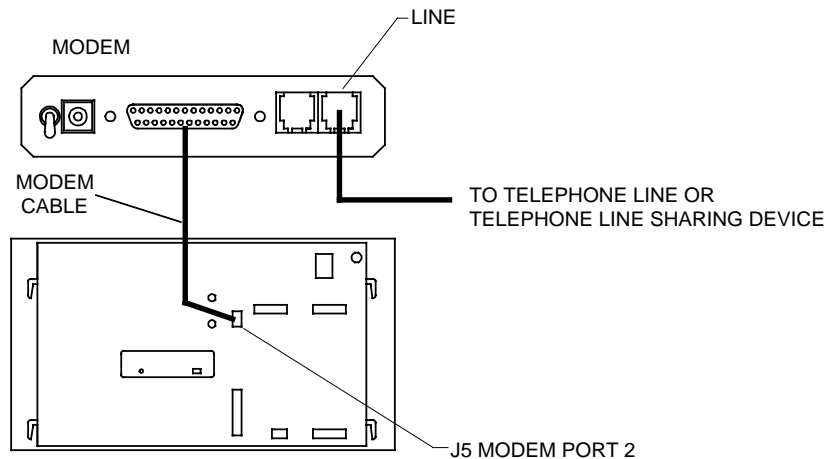
A list of recommended modems is presented in the RTDS helpfile MODEM SETUP topic. Refer to MODEM SETUP in the RTDS helpfile and purchase the desired modem for the transmitter site. To install the modem, follow the installation instructions in the modem manual.

TRANSMITTER COMMUNICATION CABLE CONNECTIONS.

Communication interface cable connection consists of attaching a standard modem cable from the modem to the transmitter controller. To connect a cable to the controller, proceed as follows:

1. For site with a single RTDS transmitter, proceed as follows:

33

A. A standard modem cable is used to connect the modem to the transmitter controller. Connect a standard modem cable from the modem **RS-232** port to **J5 MODEM PORT 2** on the controller rear-panel as shown.
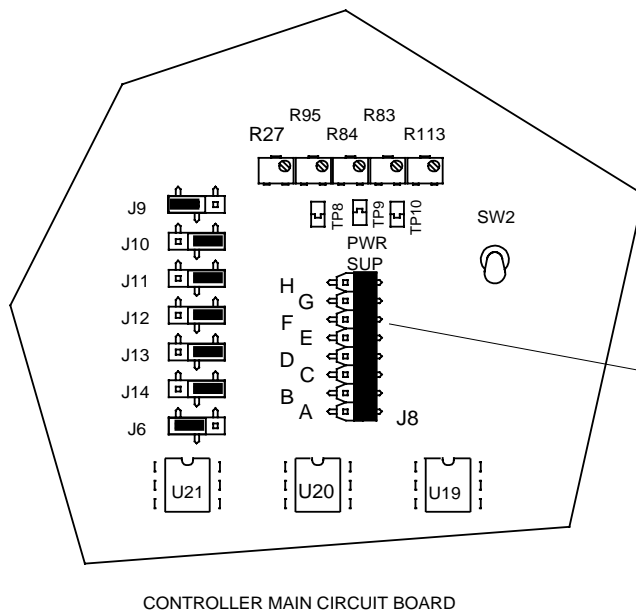

NOTE:
INSTALL JUMPER P8G ON THE
CONTROLLER MAIN CIRCUIT
BOARD. INSTALL JUMPER = MODEM
OPERATION.

RTDS12

CONNECTIONS – SINGLE RTDS TRANSMITTER

B. Jumper P8G on the controller main circuit board must be installed to configure the port for modem operation. Refer to the following illustration and install jumper P8G.
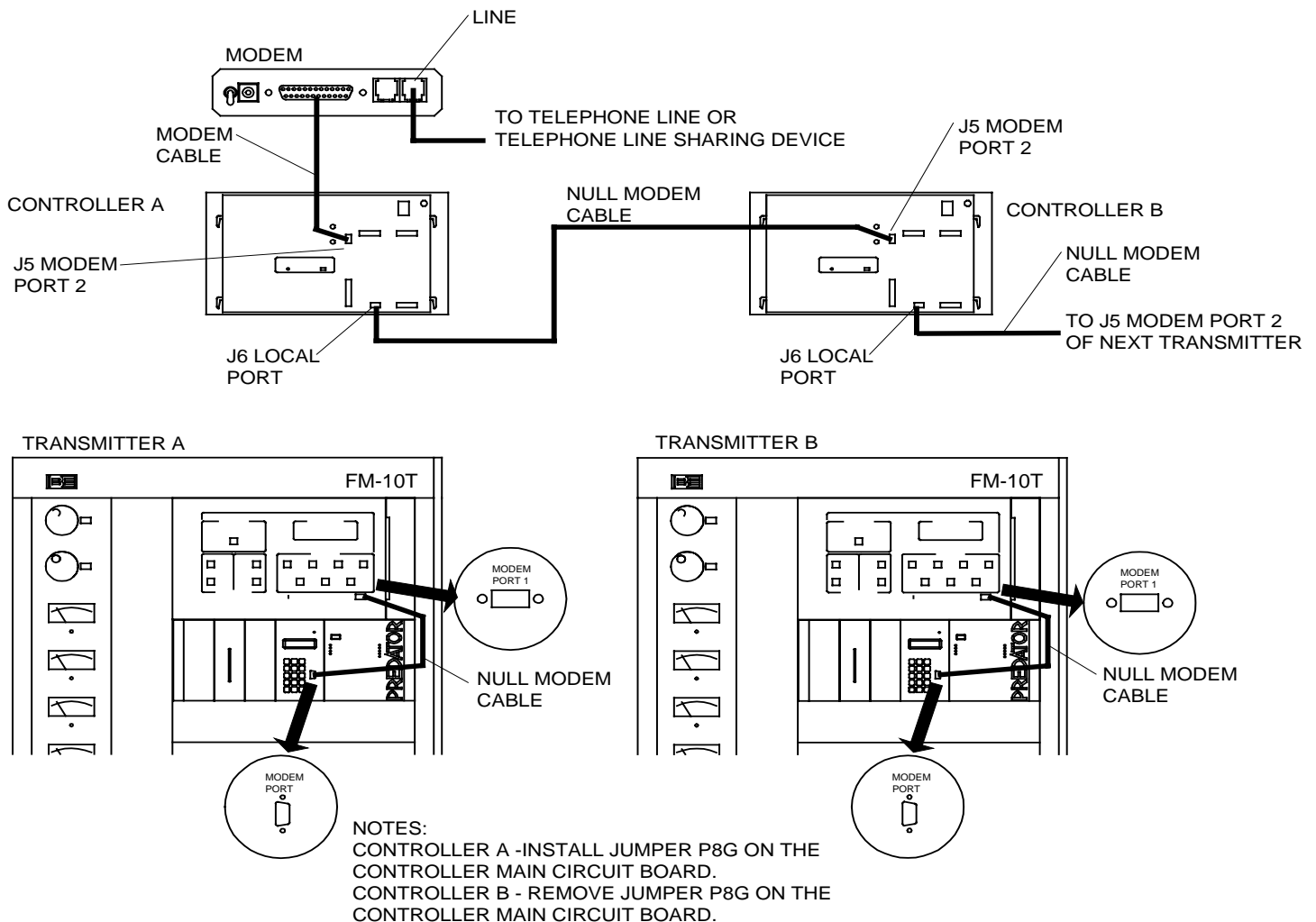

JUMPER P8G -
1. WHEN P8G IS INSTALLED:
    A. J5 MODEM PORT 2 IS CONFIGURED FOR MODEM OPERATION.
    B. LOGIN SECURITY SYSTEM IS ACTIVE.
    C. FRONT-PANEL MODEM PORT 1 IS ENABLED IF NO USER IS LOGGED INTO J5 MODEM PORT 2.
2. WHEN P8G IS REMOVED:
    A. J5 MODEM PORT 2 IS CONFIGURED FOR LOCAL OPERATION.
    B. LOGIN SECURITY SYSTEM IS DISABLED.
    C. FRONT-PANEL MODEM PORT 1 IS DISABLED.

CONTROLLER MAIN CIRCUIT BOARD

RTDS16

JUMPER P8G LOCATION ON CONTROLLER MAIN CIRCUIT BOARD

2. For sites equipped with more than one RTDS transmitter or a Broadcast Electronics PREDATOR, proceed as follows:

   A. The modem can be connected to any transmitter at the site. Select a transmitter for connection to the modem. This transmitter will be referenced in the system as transmitter A.

   B. Refer to the single transmitter site information in the preceding step and perform the procedure to connect the modem to the selected transmitter.

   C. Connect the cable to the next transmitter as follows:

   1.   Refer to the following illustration and connect a null modem cable to the next RTDS transmitter at the site. This transmitter will be referenced in the system as transmitter B.
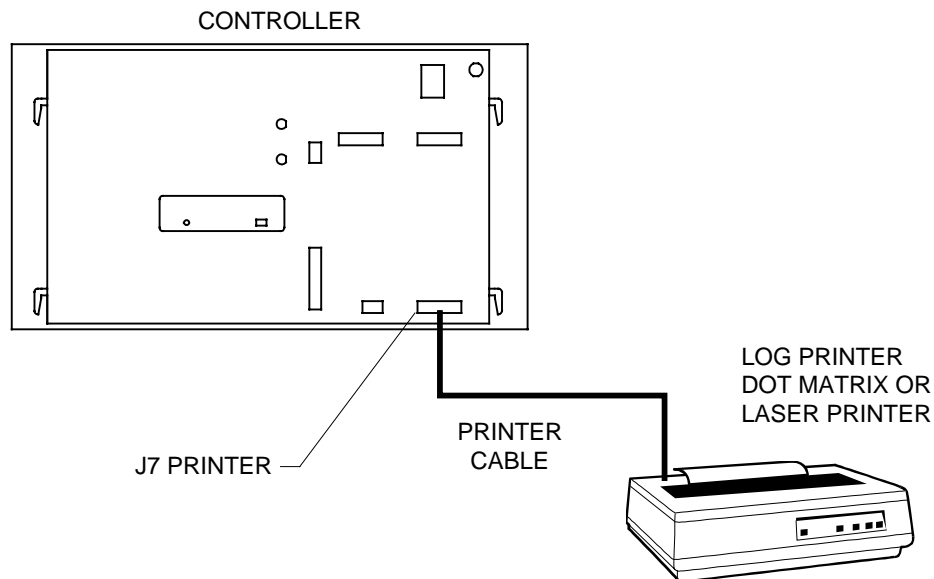

RTDS14

CONNECTIONS - MULTIPLE RTDS TRANSMITTERS

2. In the transmitter B controller, jumper P8G on the controller main circuit board must be removed to configure the port for local operation. Refer to the above illustration and remove jumper P8G.

3. Connect a null modem cable from **J6 LOCAL PORT** on transmitter controller A to **J5 MODEM PORT 2** on transmitter controller B. A null modem cable can be purchased at a local computer warehouse company or constructed. If a cable is to be created, refer to Null Modem Cable and construct the cable as shown.

4. Repeat the procedure for the next transmitter at the site.

    D. If the transmitter is equipped with a PREDATOR, connect a null modem cable from **MODEM PORT 1** on the transmitter controller to the **MODEM PORT** on the PREDATOR.

LOG PRINTER CABLE CONNECTIONS.

If transmitter site logging is desired, a printer must be connected to the transmitter rear-panel **J7 PRINTER** port. A log is a collection of transmitter data. The transmitter data included in the log consists of forward/reflected power, transmitter efficiency, plate supply parameters, screen supply parameters, grid supply parameters, dissipation, IPA parameters, and exciter parameters. The log printer can be almost any available printer such as a dot matrix or laser. To connect a printer to the transmitter, proceed as follows:

1. To attach a log printer to an RTDS transmitter, proceed as follows:

    A. Locate a printer and a printer cable to be connected to the transmitter.

    B. Connect the printer cable from the printer to the **J7 PRINTER** port on the transmitter controller rear-panel.

2. Repeat the procedure for each RTDS transmitter to be configured for logging operation.

CONTROLLER

LOG PRINTER
DOT MATRIX OR
LASER PRINTER

PRINTER
CABLE

J7 PRINTER

RTDS41

CONNECTIONS – LOG PRINTER

STUDIO/CONTROL LOCATION DIAL-UP MODEM INSTALLATION.

The studio/control location RTDS PC will also require the installation of a dial-up modem. RTDS is designed with the ability to use almost any internal or external modem available on the market.

A list of recommended modems is presented in MODEM SETUP. If a modem is to be purchased for the PC, refer to MODEM SETUP select a modem from the list. To install the modem, perform the installation instructions in the manual for the Windows 95 operating system. Ensure Windows 95 recognizes the modem. If Windows 95 does not recognize the modem, the modem will not work with RTDS.

TELEPHONE LINE-SHARING DEVICE INSTALLATION.

For sites equipped with a single telephone line and a dial-up remote control system, the telephone line must be shared between the remote control system and RTDS. This is accomplished by the installation of a telephone line-sharing device such as the ComSwitch model 5500 or the BEK-TEL model LS-3.

The ComSwitch 5500 and the BEK-TEL LS-3 provide nearly the same operating features. However, the ComSwitch 5500 is designed to switch between 2 ports and the BEK-TEL LS-3 is designed to switch between 3 ports.

The selection of a telephone line-sharing device is determined by the application. For example, a typical system is equipped with a dial-up remote control system and RTDS. If a ComSwitch 5500 is used: 1) the remote control system is connected to the TAD port, 2) the telephone handset is connected to the PHONE port, and 3) RTDS is connected to the FAX/MODEM port. Due to the ComSwitch 5500 ability to switch to only two ports (PHONE/TAD or FAX/MODEM), the telephone call must be answered immediately by the engineer before the remote control system answers the call. Also, the person answering the call at the site will not know if the caller wishes to communicate with the engineer/technician or the dial-up remote control system. This situation may be helped by adjusting a feature in the dial-up remote control system that determines the number of rings before answering.

A better solution is to use the BEK-TEL unit. This unit will allow a call to be transferred to the dial-up remote control system, RTDS, or a telephone handset. With this unit, a normal telephone call to the engineer at the site will not require an immediate answering of a call. The unit will transfer the call to the appropriate port upon reception of a special code. If the special code is not present, the call is transferred to the telephone port.

Locate and purchase the desired telephone line-sharing device. Almost any line-sharing device available on the market will work with RTDS. Some examples of telephone line-sharing devices include: 1) BEK-TEL model LS-3 and 2) ComSwitch model 5500. To install the line-sharing device, perform the following procedure.

1. Perform the installation instructions provided in the instruction manual.

2. Connection of the unit to the modem is determined by the type of desired application. A typical application is presented in the following illustration. In this application,: 1) the FAX/MODEM port is typically connected to RTDS, 2) the PHONE port is used for the connection of a telephone, and 3) the TAD port is used for the connection to the dial-up remote control system.

3. A special code must be entered in the dialing sequence. Refer to Dial-Up Operation and enter the code.
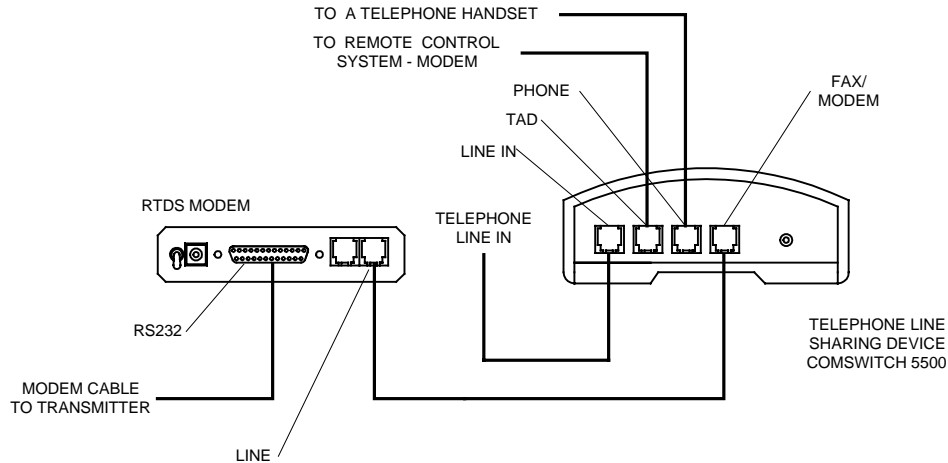
RTDS13

TELEPHONE LINE-SHARING DEVICE CONNECTIONS

CONNECTIONS - DIRECT CONNECT SYSTEM.

Direct connect operation is when an RTDS PC is connected directly to **J5 MODEM PORT 2** on the transmitter controller rear-panel. For occasional use such as a visit to the transmitter site, an RTDS computer can also be connected to **MODEM PORT 1** on the transmitter controller front panel.

NOTE:

1. 50 FT FOR COPPER CABLE
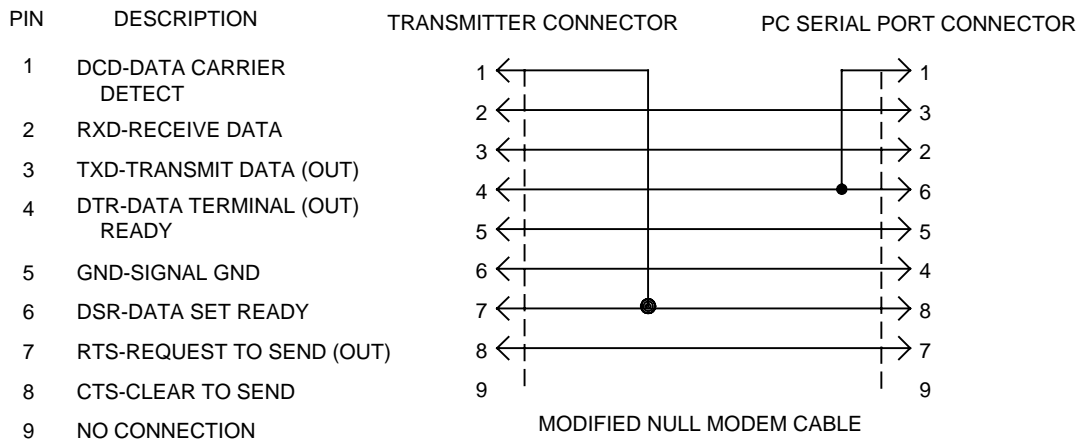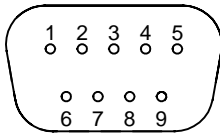
2. 2000 FT FOR FIBER OPTIC CABLE
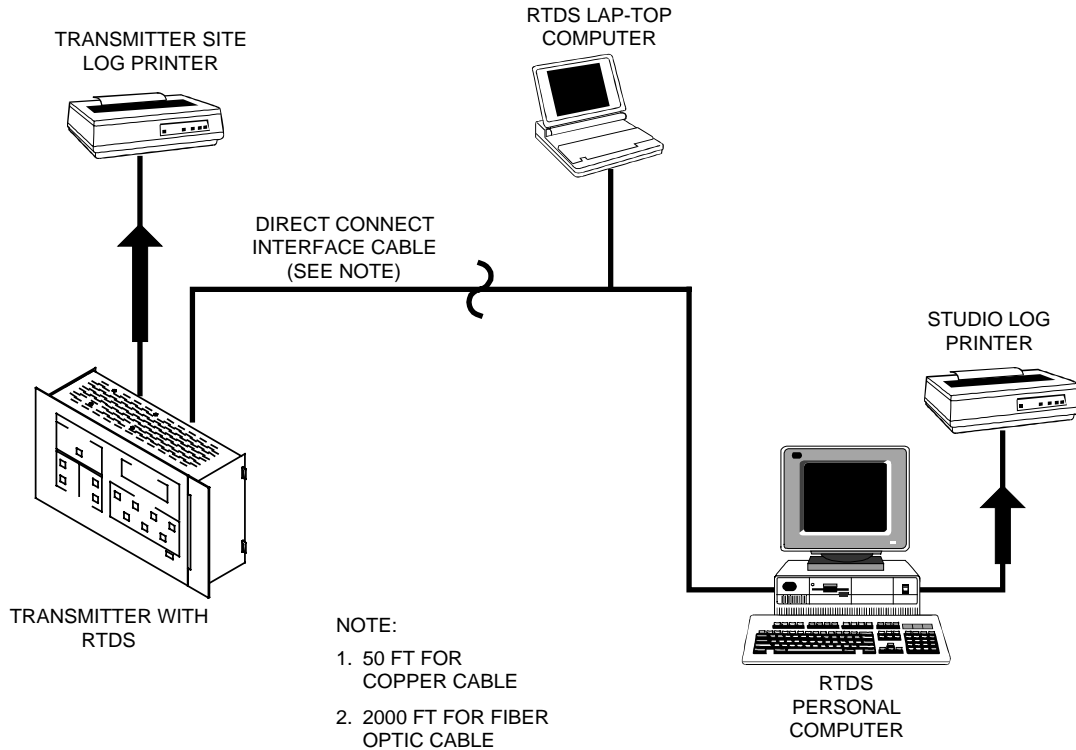
RTDS8

RTDS COMMUNICATION – USING DIRECT CONNECTION

Typically, a direct connect system is used when the operator is at the transmitter site or the RTDS computer is located within approximately 2000 feet of the transmitter. If the computer is located within 50 feet of the transmitter, copper wire cable can be used to connect the computer to the transmitter. If the computer is located from 50 to 2000 feet from the transmitter, fiber optic cable must be used to connect the computer to the transmitter. The following text presents the procedures to install a direct connect system and connect a log printer to the transmitter.

NORMAL CONNECTION – J5 MODEM PORT 2.

**1.** For site with a single RTDS transmitter, proceed as follows;

A. A modified null modem cable is required to connect the RTDS computer to the transmitter. Refer to the following illustration and create a modified null modem cable.

PIN	DESCRIPTION
1	DCD-DATA CARRIER DETECT
2	RXD-RECEIVE DATA
3	TXD-TRANSMIT DATA (OUT)
4	DTR-DATA TERMINAL (OUT) READY
5	GND-SIGNAL GND
6	DSR-DATA SET READY
7	RTS-REQUEST TO SEND (OUT)
8	CTS-CLEAR TO SEND
9	NO CONNECTION

MODIFIED NULL MODEM CABLE

RTDS39

MODIFIED NULL MODEM CABLE

B. The modified null modem cable is used to connect the RTDS computer to the transmitter controller. Connect a modified null modem cable from an unused computer COM port to **J5 MODEM PORT 2** on the controller rear-panel as shown.
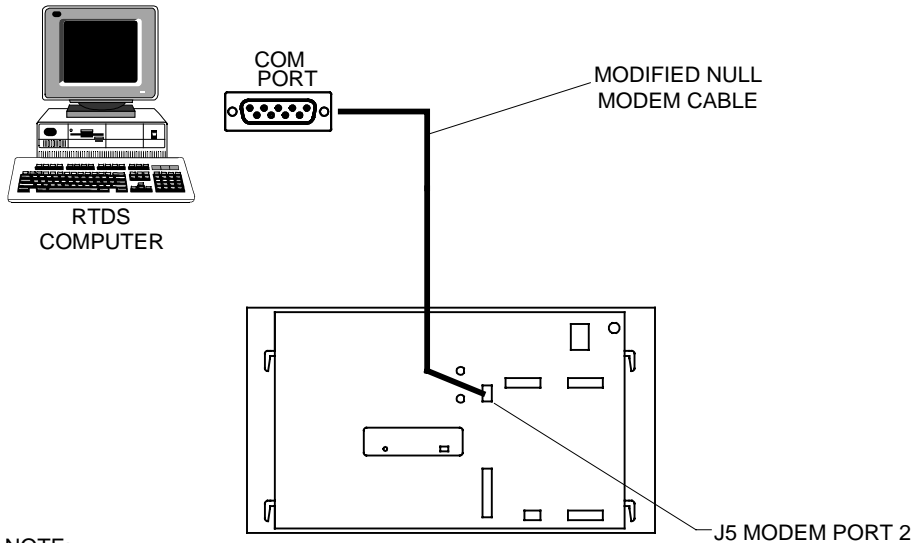
NOTE:
1. INSTALL JUMPER P8G ON THE CONTROLLER MAIN CIRCUIT BOARD. INSTALL JUMPER - ENABLES MODEM OPERATION, SECURITY, AND MODEM 1 PORT OPERATION.
2. COPPER CABLE CAN BE USED WHEN THE DISTANCE BETWEEN THE RTDS COMPUTER AND THE TRANSMITTER IS LESS THAN 50 FEET.
3. FIBER OPTIC CABLE MUST BE USED WHEN THE DISTANCE BETWEEN THE RTDS COMPUTER AND THE TRANSMITTER IS FROM 50 TO 2000 FEET.

RTDS36

CONNECTIONS – SINGLE RTDS TRANSMITTER

C. Jumper P8G on the controller main circuit board must be installed to configure **MODEM PORT 2** for modem operation. Refer to the following illustration and install jumper P8G.
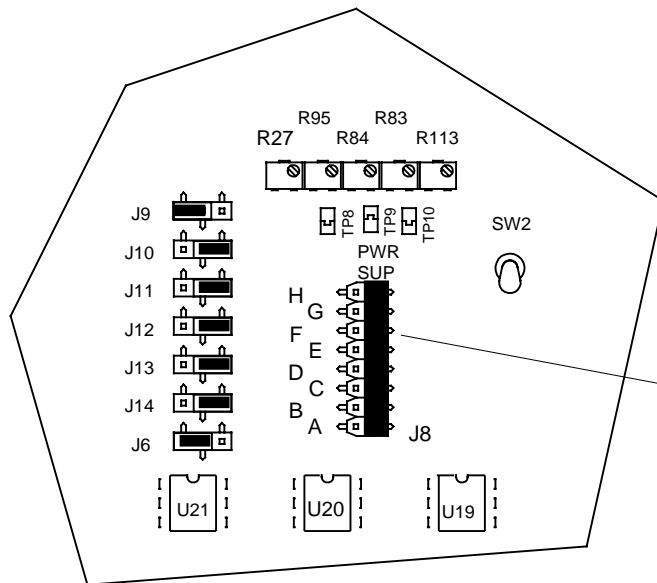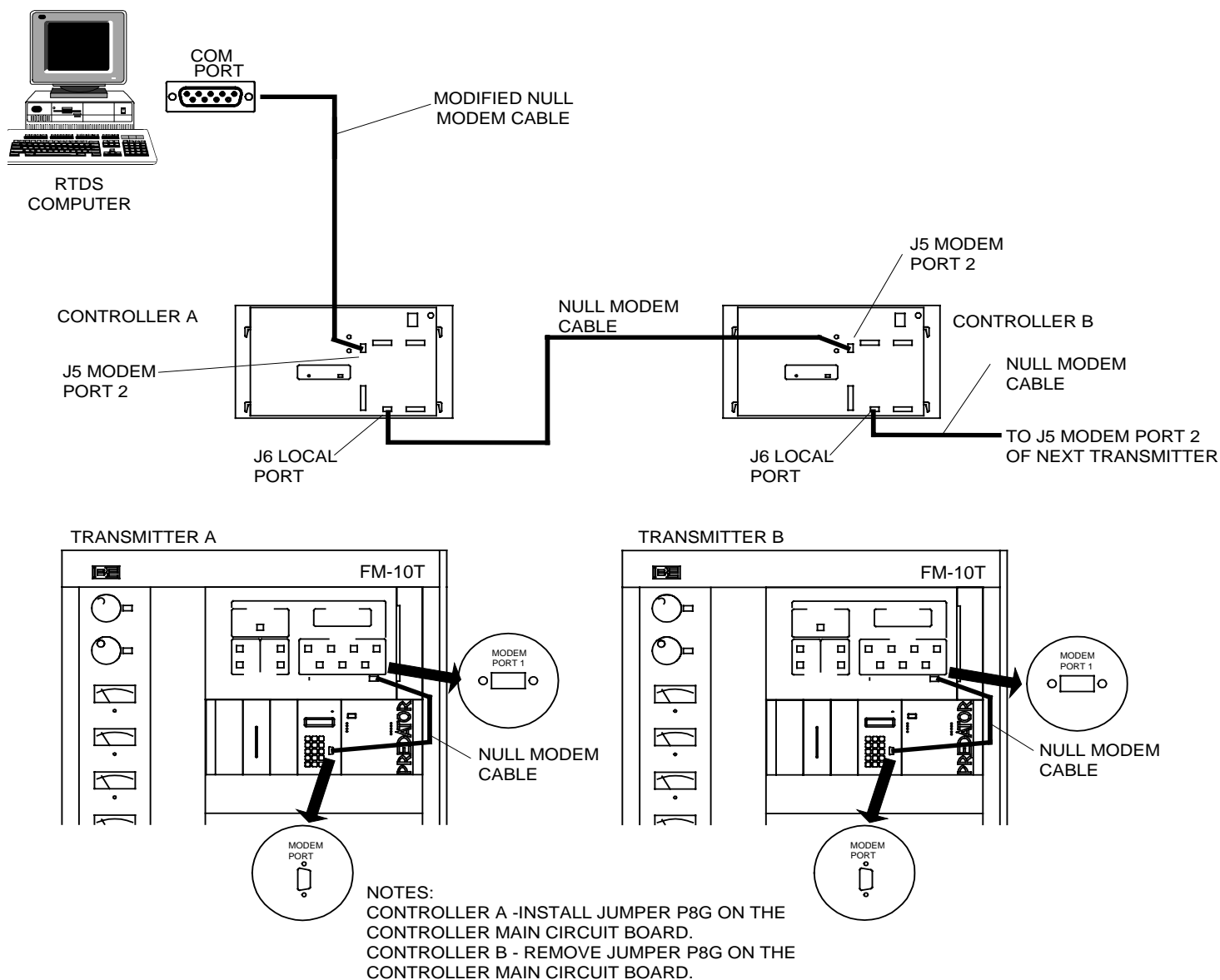
JUMPER P8G -
1. WHEN P8G IS INSTALLED:
   A. J5 MODEM PORT 2 IS CONFIGURED FOR MODEM OPERATION.
   B. LOGIN SECURITY SYSTEM IS ACTIVE.
   C. FRONT-PANEL MODEM PORT 1 IS ENABLED IF NO USER IS LOGGED INTO J5 MODEM PORT 2.
2. WHEN P8G IS REMOVED:
   A. J5 MODEM PORT 2 IS CONFIGURED FOR LOCAL OPERATION.
   B. LOGIN SECURITY SYSTEM IS DISABLED.
   C. FRONT-PANEL MODEM PORT 1 IS DISABLED.

CONTROLLER MAIN CIRCUIT BOARD

RTDS16

JUMPER P8G LOCATION ON CONTROLLER MAIN CIRCUIT BOARD

2. For sites equipped with more than one RTDS transmitter or a Broadcast Electronics PREDATOR, proceed as follows:

A. The RTDS computer can be connected to any transmitter at the site. Select a transmitter for connection to the RTDS computer. This transmitter will be referenced in the system as transmitter A.

B. Refer to the single transmitter site information in the preceding step and perform the procedure to connect the RTDS computer to the selected transmitter.

C. Connect the cable to the next transmitter as follows:

1. Select the next RTDS transmitter at the site. This transmitter will be referenced in the system as transmitter B.
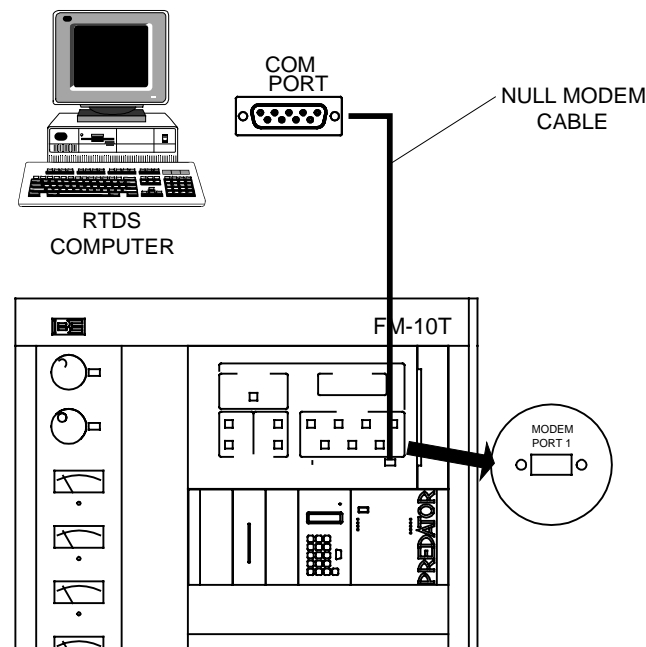
CONNECTIONS - MULTIPLE RTDS TRANSMITTERS

2. In the transmitter B controller, jumper P8G on the controller main circuit board must be removed to configure the port for local operation. Refer to the above illustration and remove jumper P8G.

3. Connect a null modem cable from **J6 LOCAL PORT** on transmitter controller A to **MODEM PORT 2** on transmitter controller B. A null modem cable can be purchased at a local computer warehouse company or constructed. If a cable is to be created, refer to Null Modem Cable and construct the cable as shown.

4. Repeat the procedure for the next transmitter at the site.

D. If the transmitter is equipped with a PREDATOR, connect a null modem cable from **MODEM PORT 1** on the transmitter controller to the **MODEM PORT** on the PREDATOR.

LOCAL USE CONNECTION – FRONT-PANEL MODEM PORT 1.

1. For local use such as a visit to the transmitter site, the RTDS computer can be connected to **MODEM PORT 1** on the transmitter controller front-panel using a null modem cable. Connection to this port bypasses the RTDS security system. Therefore, only use this port when the user is at the transmitter. To connect to **MODEM PORT 1**, connect a null modem cable from an unused computer COM port to **MODEM PORT 1** on the controller front-panel as shown

FRONT PANEL PORT CONNECTION - OCCASIONAL USE

RTDS38

CONNECTIONS – MODEM PORT 1

LOG PRINTER CABLE CONNECTIONS.

If transmitter site logging is desired, a printer must be connected to the transmitter rear-panel **J7 PRINTER** port. A log is a collection of transmitter data. The transmitter data included in the log consists of forward/reflected power, transmitter efficiency, plate supply parameters, screen supply parameters, grid supply parameters, dissipation, IPA parameters, and exciter parameters. The log printer can be almost any available printer such as a dot matrix or laser type printer. To connect a printer to the transmitter, proceed as follows:

1. To attach a log printer to an RTDS transmitter, proceed as follows:

    A. Locate a printer and a printer cable to be connected to the transmitter.

    B. Connect the printer cable from the printer to the **J7 PRINTER** port on the transmitter controller rear-panel.

2. Repeat the procedure for each RTDS transmitter to be configured for logging operation.
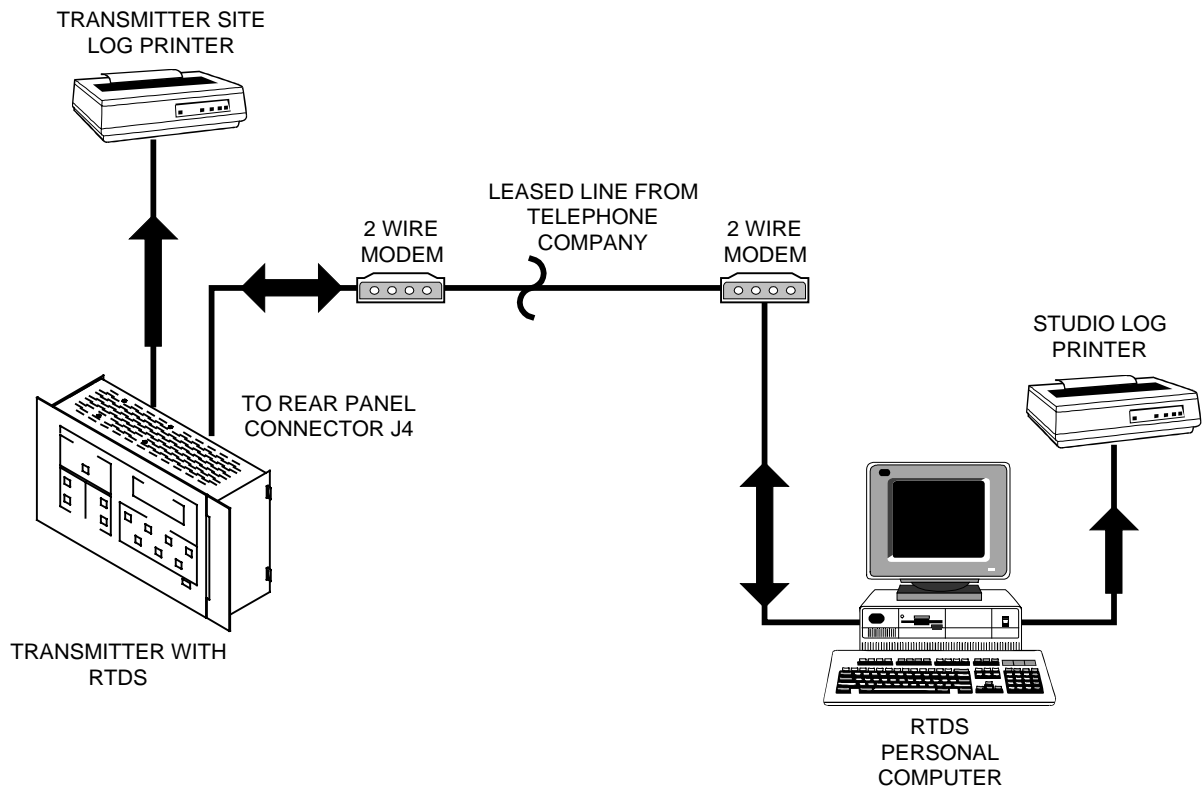
CONTROLLER

LOG PRINTER
DOT MATRIX OR
LASER PRINTER

J7 PRINTER
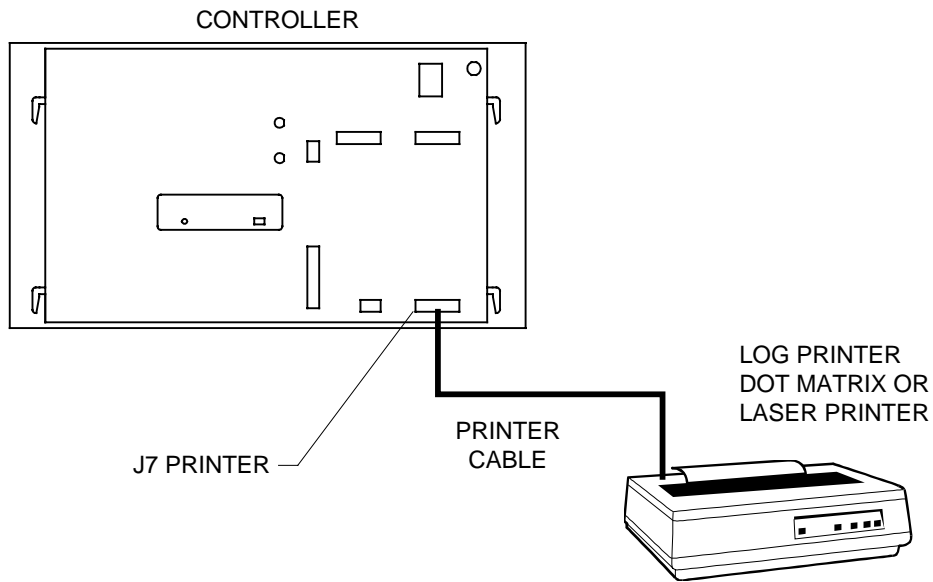
PRINTER
CABLE

RTDS41

CONNECTIONS – LOG PRINTER

CONNECTIONS - LEASED TELEPHONE LINE SYSTEM.

The installation of a leased telephone line communication system requires the installation of a two-wire mode at the transmitter site and in the RTDS PC. The following text presents the procedures to install a leased telephone line system and connect a log printer to the transmitter.

TRANSMITTER SITE
LOG PRINTER

LEASED LINE FROM
TELEPHONE
COMPANY

2 WIRE
MODEM

2 WIRE
MODEM

STUDIO LOG
PRINTER

TO REAR PANEL
CONNECTOR J4

TRANSMITTER WITH
RTDS

RTDS
PERSONAL
COMPUTER

RTDS7

RTDS COMMUNICATION – USING A LEASED TELEPHONE LINE

INSTALL A TELEPHONE LINE PROTECTION DEVICE.

It is strongly recommended the transmitter site and control locations be equipped with telephone line protection devices. This will prevent damage to the modems from surges/spikes such as lightning on the telephone line.

• Telephone Line Protection.

## INSTALL THE TRANSMITTER SITE TWO-WIRE MODEM.

The transmitter site will require the installation of an external two-wire modem. The system can use almost any two-wire modem available on the market.

Locate and purchase the desired modem for the transmitter site. To install the modem, follow the installation instructions in the modem manual.

TRANSMITTER COMMUNICATION CABLE CONNECTIONS.

Communication interface cable connection consists of attaching a standard modem cable from the two-wire modem to the transmitter controller. To connect a cable to the controller, proceed as follows:

1. For site with a single RTDS transmitter, proceed as follows;

    A. A standard modem cable is used to connect the two-wire modem to the transmitter controller. Connect a standard modem cable from the modem **RS-232** port to **MODEM PORT 2** on the controller rear-panel as shown.
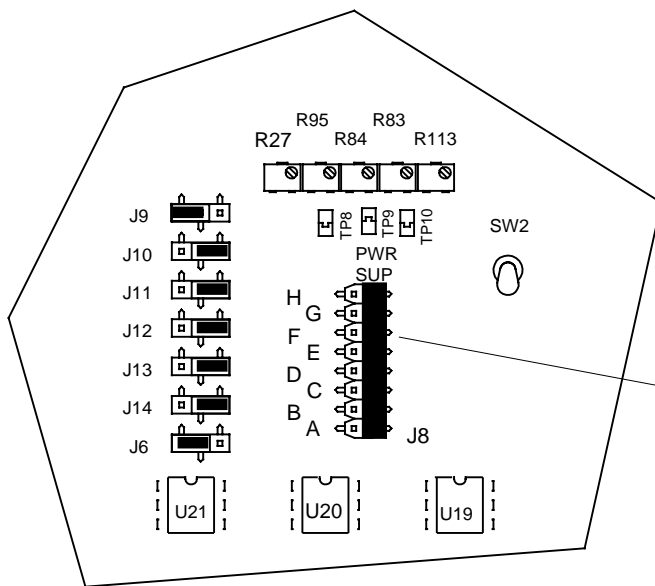
45

TWO-WIRE
MODEM

LINE

MODEM
CABLE

TO LEASED TELEPHONE LINE

J5 MODEM PORT 2
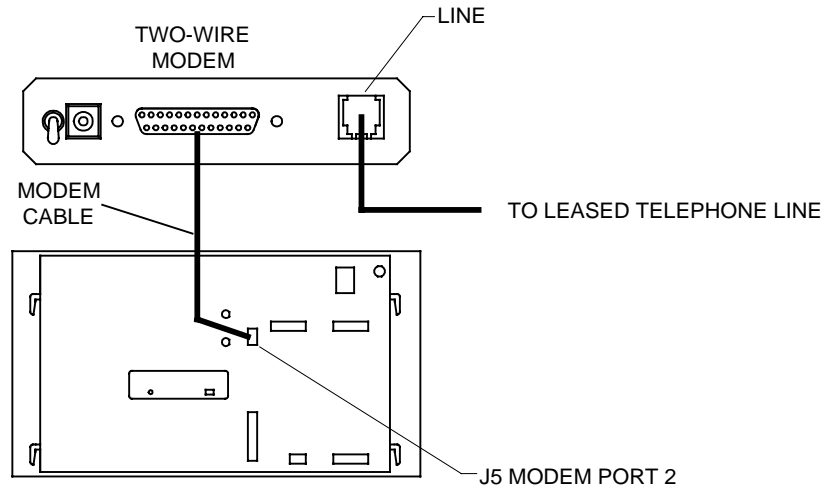
NOTE:
* - INSTALL JUMPER P8G ON THE
CONTROLLER MAIN CIRCUIT
BOARD. INSTALL JUMPERS =
MODEM OPERATION.

RTDS42

CONNECTIONS – SINGLE RTDS TRANSMITTER

B. Jumper P8G on the controller main circuit board must be installed to configure the port for modem operation. Refer to the following illustration and install jumper P8G.

R95   R83
R27   R84   R113

J9

J10

J11

J12   H
             G
J13   F
             E
J14   D
             C
J6   B
             A

TP8 TP9 TP10
PWR
SUP

SW2

J8

U21   U20   U19

CONTROLLER MAIN CIRCUIT BOARD

JUMPER P8G -
1. WHEN P8G IS INSTALLED:
    A. J5 MODEM PORT 2 IS CONFIGURED FOR
       MODEM OPERATION.
    B. LOGIN SECURITY SYSTEM IS ACTIVE.
    C. FRONT-PANEL MODEM PORT 1 IS
       ENABLED IF NO USER IS LOGGED INTO
       J5 MODEM PORT 2.
2. WHEN P8G IS REMOVED:
    A. J5 MODEM PORT 2 IS CONFIGURED FOR
       LOCAL OPERATION.
    B. LOGIN SECURITY SYSTEM IS DISABLED.
    C. FRONT-PANEL MODEM PORT 1 IS
       DISABLED.

RTDS16

JUMPER P8G LOCATION ON CONTROLLER MAIN CIRCUIT BOARD

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2. For sites equipped with more than one RTDS transmitter or a Broadcast Electronics PREDATOR, proceed as follows:

A. The two-wire modem can be connected to any transmitter at the site. Select a transmitter for connection to the modem. This transmitter will be referenced in the system as transmitter A.

B. Refer to the single transmitter site information in the preceding step and perform the procedure to connect the two-wire modem to the selected transmitter.

C. Connect the cable to the next transmitter as follows:

1. Refer to the following illustration and connect a null modem cable to the next RTDS transmitter at the site. This transmitter will be referenced in the system as transmitter B.
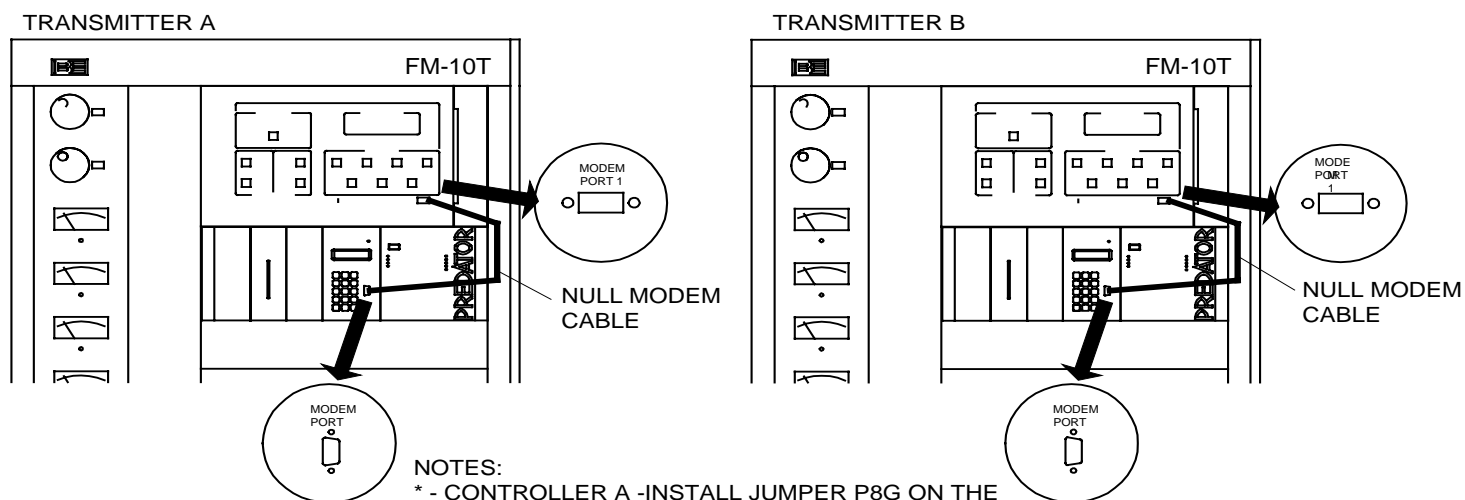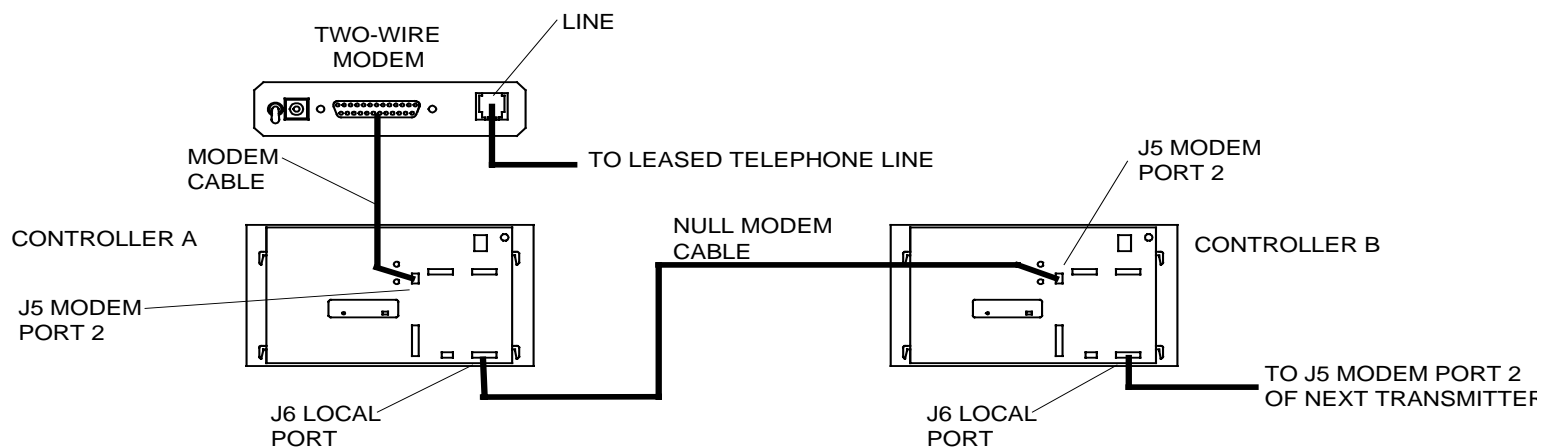
NOTES:
* - CONTROLLER A -INSTALL JUMPER P8G ON THE CONTROLLER MAIN CIRCUIT BOARD.
** - CONTROLLER B - REMOVE JUMMPER P8G ON THE CONTROLLER MAIN CIRCUIT BOARD.

RTDS43

CONNECTIONS - MULTIPLE RTDS TRANSMITTERS

2. In the transmitter B controller, jumper P8G on the controller main circuit board must be removed to configure the port for local operation. Refer to the above illustration and remove jumper P8G.

3. Connect a null modem cable from **J6 LOCAL PORT** on transmitter controller A to **MODEM PORT 2** on transmitter controller B. A null modem cable can be purchased at a local computer warehouse company or constructed. If a cable is to be created, refer to Null Modem Cable and construct the cable as shown.

4. Repeat the procedure for the next transmitter at the site.

D. If the transmitter is equipped with a PREDATOR, connect a null modem cable from **MODEM PORT 1** on the transmitter controller to the **MODEM PORT** on the PREDATOR.

LOG PRINTER CABLE CONNECTIONS.

If transmitter site logging is desired, a printer must be connected to the transmitter rear-panel **J7 PRINTER** port. A log is a collection of transmitter data. The transmitter data included in the log consists of forward/reflected power, transmitter efficiency, plate supply parameters, screen supply parameters, grid supply parameters, dissipation, IPA parameters, and exciter parameters. The log printer can be almost any available printer such as a dot matrix or laser type printer.

1. To attach a log printer to an RTDS transmitter, proceed as follows:

A. Locate a printer and a printer cable to be connected to the transmitter.

B. Connect the printer cable from the printer to the **J7 PRINTER** port on the transmitter controller rear-panel.

2. Repeat the procedure for each RTDS transmitter to be configured for logging operation.
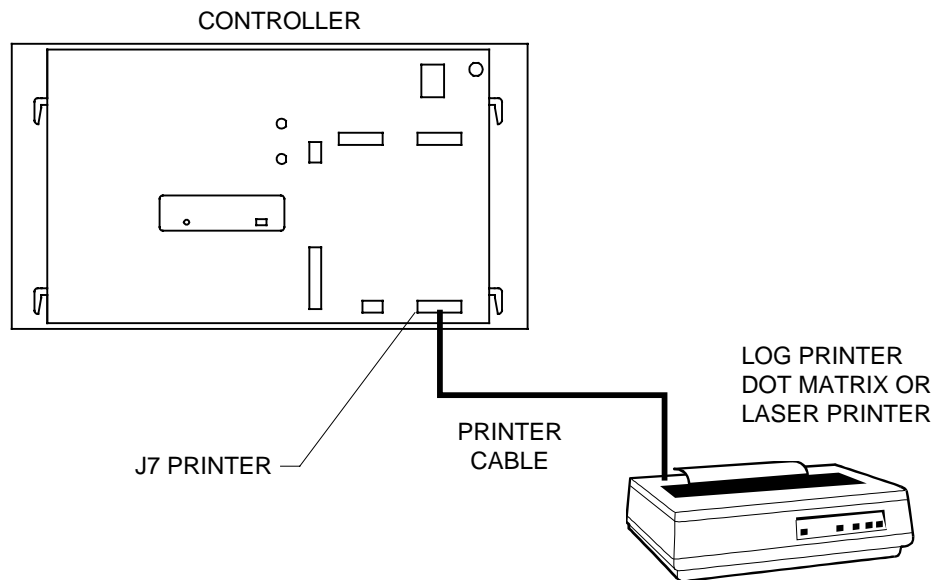
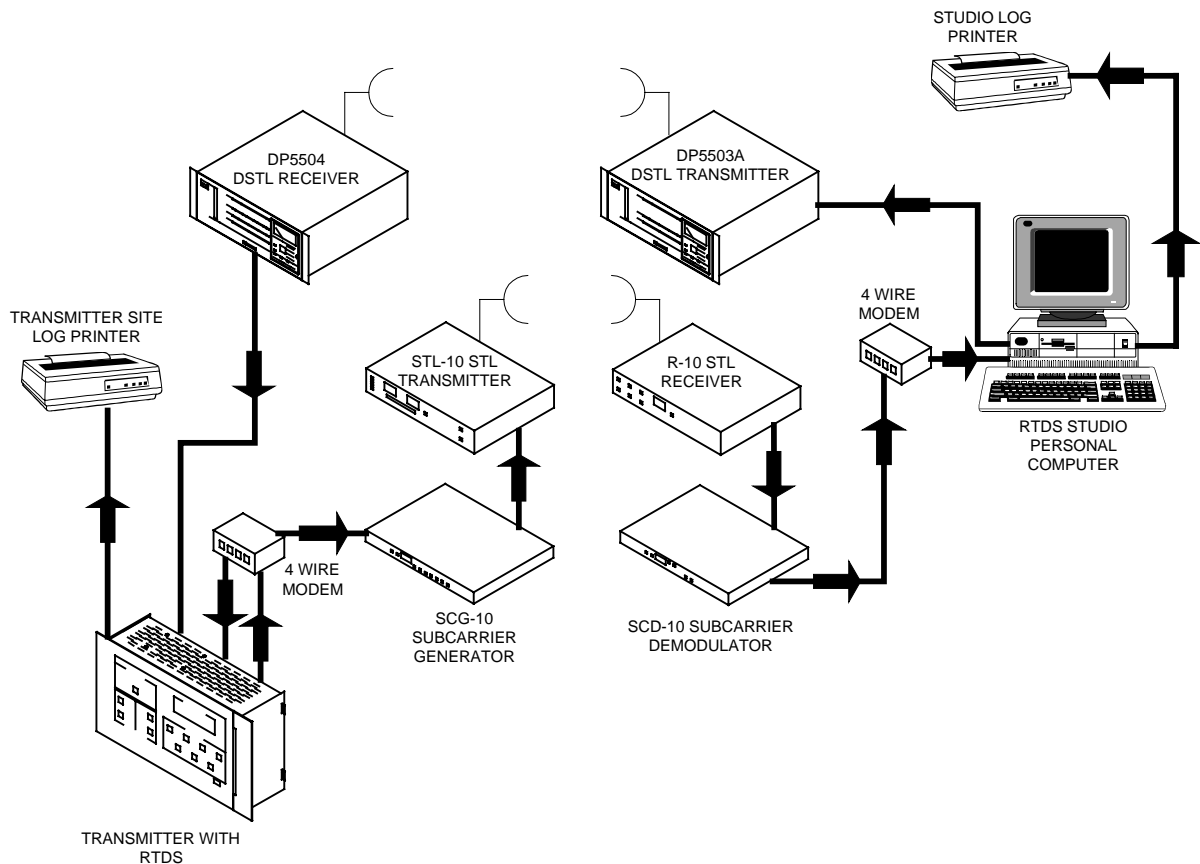*RTDS41*

CONNECTIONS – LOG PRINTER

STUDIO/CONTROL LOCATION TWO-WIRE MODEM INSTALLATION.

The studio/control location RTDS PC will also require the installation of a two-wire modem. RTDS is designed with the ability to use almost any internal or external two-wire modem available on the market.

Locate and purchase the desired modem for the PC. To install the modem, perform the installation instructions in the manual for the Windows 95 operating system. Ensure Windows 95 recognizes the modem. If Windows 95 does not recognize the modem, the modem will not work with RTDS.
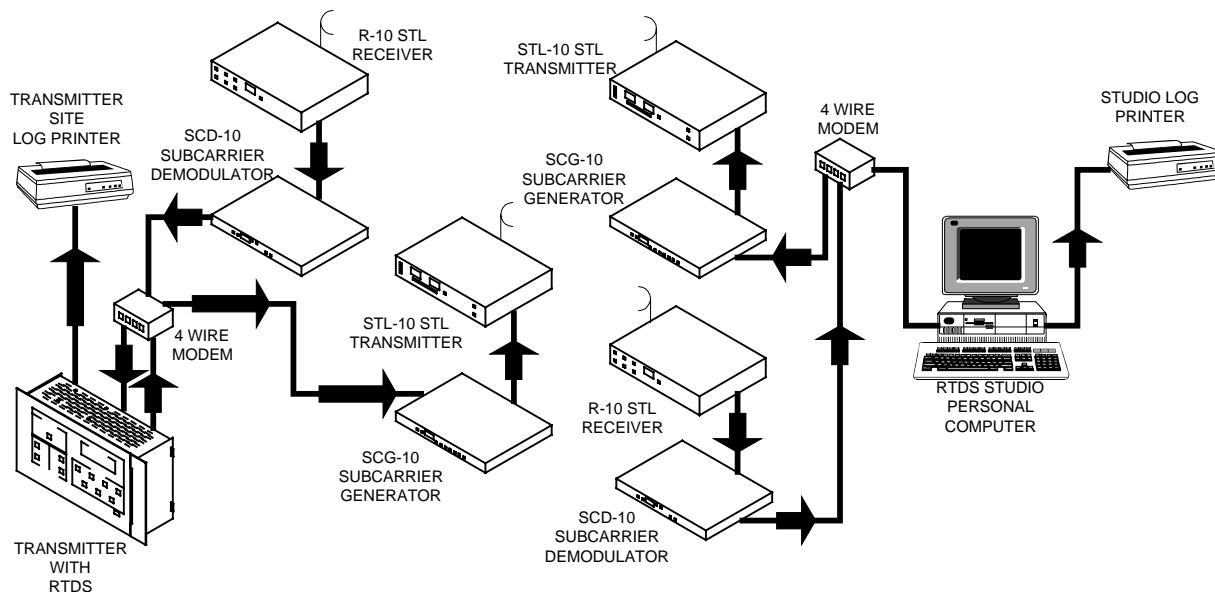
CONNECTIONS - RF SYSTEM.

The installation of an RF communication system requires the installation of several pieces of RF communication equipment. The connections are determined by the type of RF system to be constructed. The following illustration presents two typical RF systems.

RTDS9

RF COMMUNICATION – SYSTEM WITH DIGITAL STL UNITS AND ANALOG TSL UNITS

TRANSMITTER SITE LOG PRINTER

R-10 STL RECEIVER

STL-10 STL TRANSMITTER

SCD-10 SUBCARRIER DEMODULATOR

4 WIRE MODEM

STUDIO LOG PRINTER

SCG-10 SUBCARRIER GENERATOR

4 WIRE MODEM

STL-10 STL TRANSMITTER

SCG-10 SUBCARRIER GENERATOR

R-10 STL RECEIVER

RTDS STUDIO PERSONAL COMPUTER

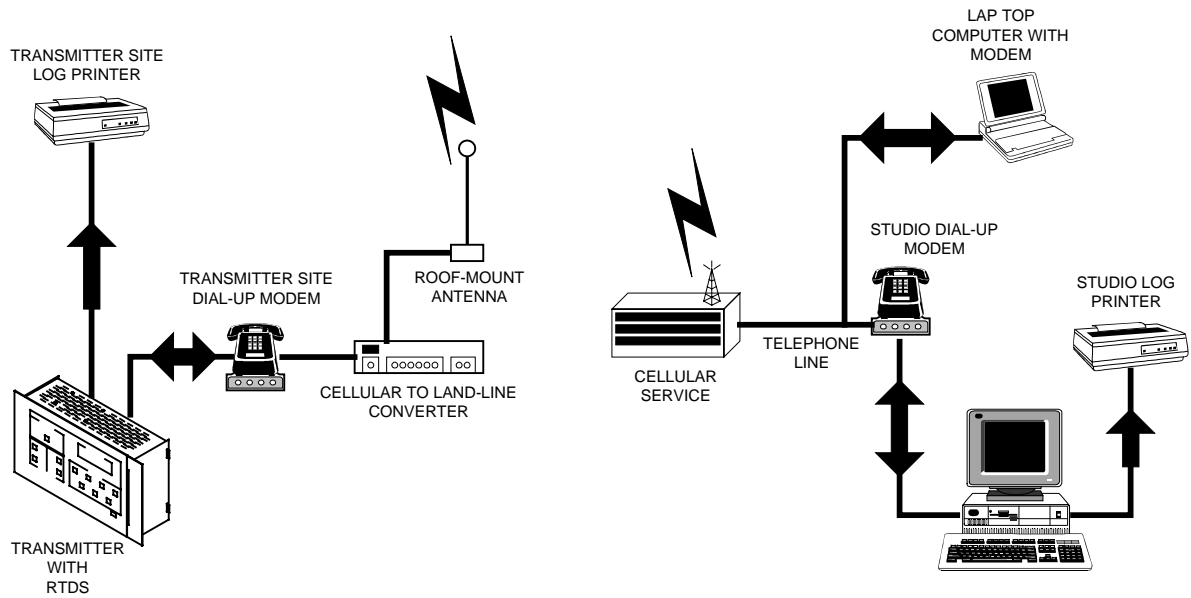TRANSMITTER WITH RTDS

SCD-10 SUBCARRIER DEMODULATOR

RTDS10

RF COMMUNICATION – SYSTEM WITH ANALOG STL AND TSL UNITS

RF communication systems are typically custom designed to meet specific requirements of a site. As a result, the connections for an RF communication system are provided with special documentation shipped with the equipment. If an RF communication system is required for a specific site, contact the Broadcast Electronics Customer Service Department. The Customer Service Department can provide assistance in the design of a system to meet the needs of a site.

CONNECTIONS - CELLULAR TELEPHONE SYSTEM.

Communication between an RTDS computer and the transmitter site can be performed using a cellular telephone system. This type of system provides full duplex communication. The control location uses: 1) an RTDS computer with a modem and 2) a cellular telephone. The transmitter site uses a roof-top-mounted cellular antenna, a cellular telephone, and a modem. The following text presents the procedures to install a cellular telephone system and connect a log printer to the transmitter.

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TRANSMITTER SITE LOG PRINTER

LAP TOP COMPUTER WITH MODEM

TRANSMITTER SITE DIAL-UP MODEM

ROOF-MOUNT ANTENNA

STUDIO DIAL-UP MODEM

STUDIO LOG PRINTER

CELLULAR TO LAND-LINE CONVERTER

CELLULAR SERVICE

TELEPHONE LINE

TRANSMITTER WITH RTDS

RTDS11

RTDS COMMUNICATION – USING A CELLULAR TELEPHONE SYSTEM

INSTALL THE CELLULAR TO LAND-LINE CONVERTER.

A cellular system requires the installation of a cellular to land-line converter. The device converts a cellular communication signal to a standard land-line signal. This allows standard land-line modems and modular RJ-11 connectors to be used in the communication path. A typical cellular to land-line converter is the TELULAR Phonecell Model SX3I. This converter is equipped with a roof-top mount antenna and a battery backup system.

Determine the converter to be purchased and installed at the site. If additional assistance is needed to select a specific converter model, contact the Broadcast Electronics Customer Service Department. Once the converter is purchased, install the unit by following the installation instructions in the manual.
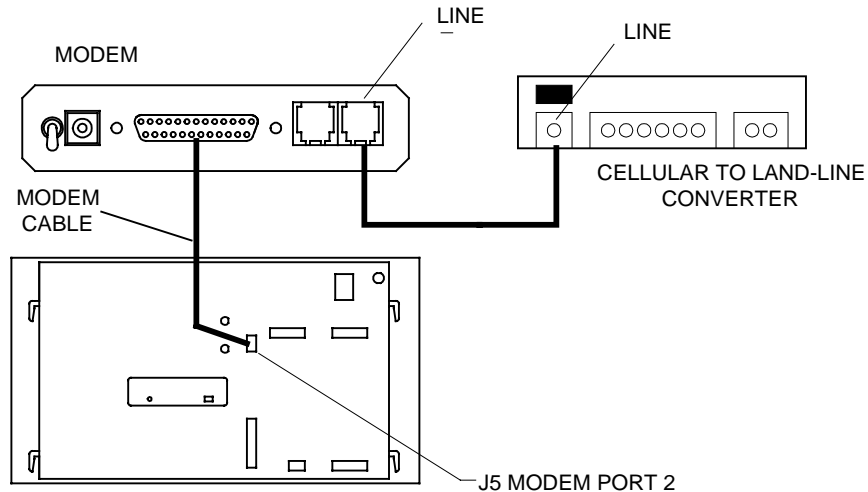
INSTALL THE TRANSMITTER SITE DIAL-UP MODEM.

The transmitter site will require the installation of an external dial-up modem. RTDS is designed with the ability to use almost any external modem available on the market.

A list of recommended modems is presented in MODEM SETUP. Refer to MODEM SETUP and purchase the desired modem for the transmitter site. To install the modem, follow the installation instructions in the modem manual.

TRANSMITTER COMMUNICATION CABLE CONNECTIONS.

Communication interface cable connection consists of attaching a standard modem cable from the modem to the transmitter controller. To connect a cable to the controller, proceed as follows:

1. For site with a single RTDS transmitter, proceed as follows;

   A. A standard modem cable is used to connect the modem to the transmitter controller. Connect a standard modem cable from the modem **RS-232** port to **J5 MODEM PORT 2** on the controller rear-panel as shown.
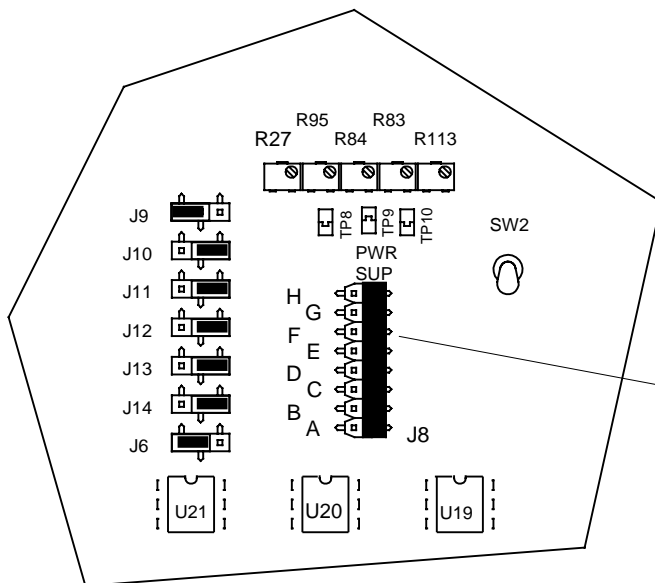
51

MODEM

LINE

LINE

MODEM CABLE

CELLULAR TO LAND-LINE CONVERTER

J5 MODEM PORT 2

NOTE:
INSTALL JUMPER P8G ON THE
CONTROLLER MAIN CIRCUIT
BOARD. INSTALL JUMPER = MODEM
OPERATION.

RTDS75

CONNECTIONS – SINGLE RTDS TRANSMITTER

B. Jumper P8G on the controller main circuit board must be installed to configure the port for modem operation. Refer to the following illustration and install jumper P8G.
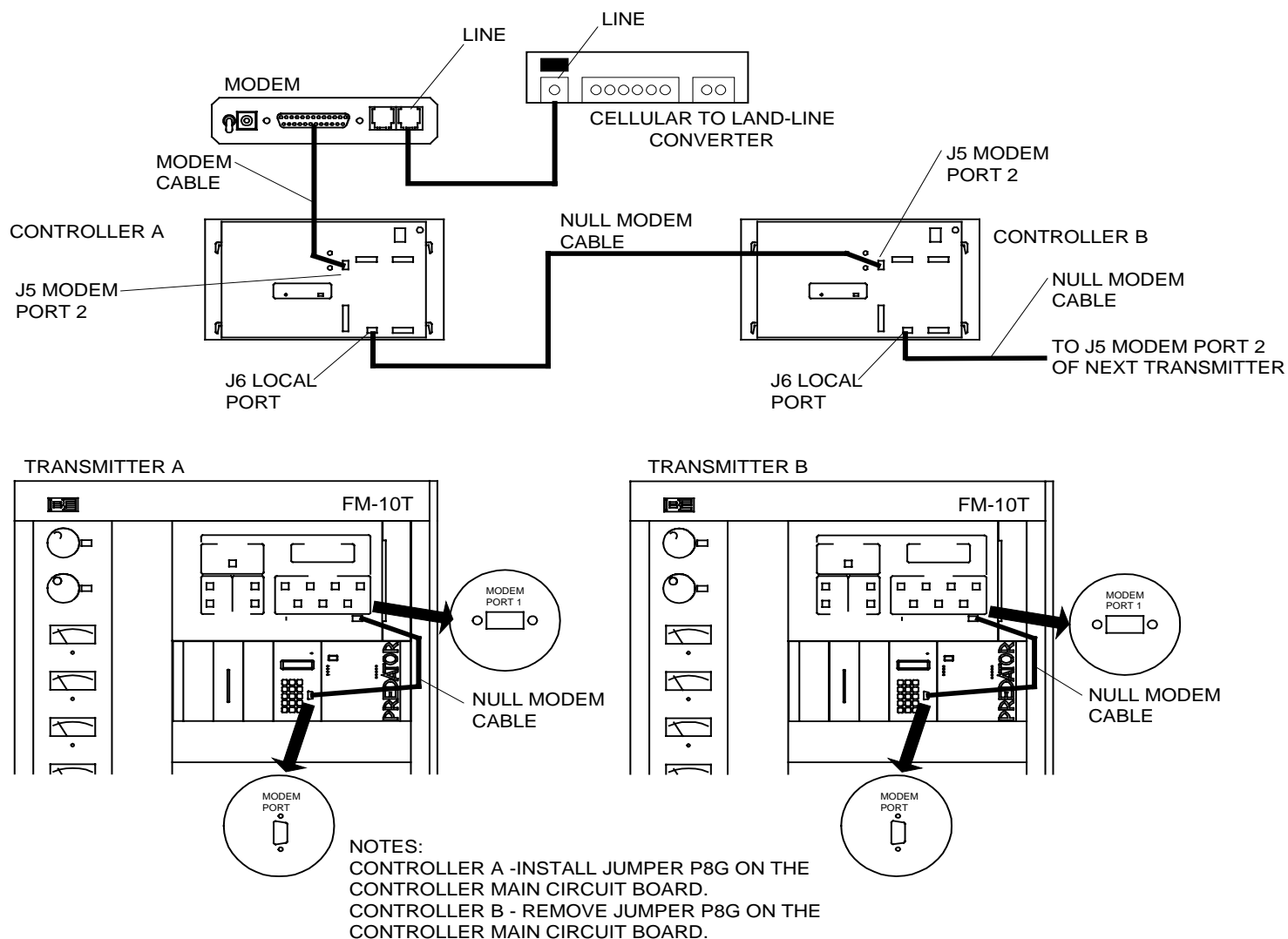

CONTROLLER MAIN CIRCUIT BOARD

JUMPER P8G -
1. WHEN P8G IS INSTALLED:
  A. J5 MODEM PORT 2 IS CONFIGURED FOR MODEM OPERATION.
  B. LOGIN SECURITY SYSTEM IS ACTIVE.
  C. FRONT-PANEL MODEM PORT 1 IS ENABLED IF NO USER IS LOGGED INTO J5 MODEM PORT 2.
2. WHEN P8G IS REMOVED:
  A. J5 MODEM PORT 2 IS CONFIGURED FOR LOCAL OPERATION.
  B. LOGIN SECURITY SYSTEM IS DISABLED.
  C. FRONT-PANEL MODEM PORT 1 IS DISABLED.

RTDS16

JUMPER P8G LOCATION ON CONTROLLER MAIN CIRCUIT BOARD

2. For sites equipped with more than one RTDS transmitter or a Broadcast Electronics PREDATOR, proceed as follows:

    A. The modem can be connected to any transmitter at the site. Select a transmitter for connection to the modem. This transmitter will be referenced in the system as transmitter A.

    B. Refer to the single transmitter site information in the preceding step and perform the procedure to connect the modem to the selected transmitter.

    C. Connect the cable to the next transmitter as follows:

        1. Refer to the following illustration and connect a null modem cable to the next RTDS transmitter at the site. This transmitter will be referenced in the system as transmitter B.
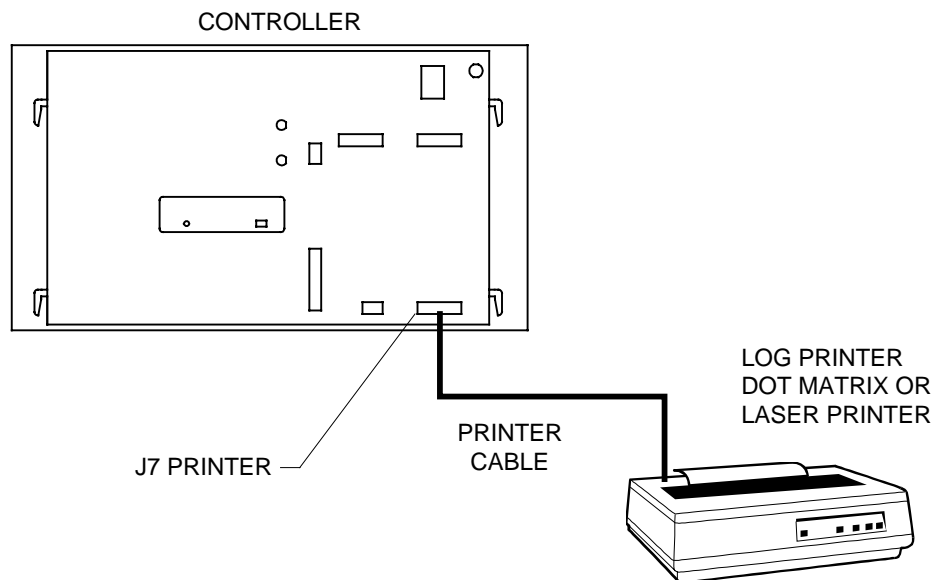

RTDS76

CONNECTIONS – MULTIPLE RTDS TRANSMITTERS

2. In the transmitter B controller, jumper P8G on the controller main circuit board must be removed to configure the port for local operation. Refer to the above illustration and remove jumper P8G.

3. Connect a null modem cable from **J6 LOCAL PORT** on transmitter controller A to **J5 MODEM PORT 2** on transmitter controller B. A null modem cable can be purchased at a local computer warehouse company or constructed. If a cable is to be created, refer to Null Modem Cable and construct the cable as shown.

4. Repeat the procedure for the next transmitter at the site.

D. If the transmitter is equipped with a PREDATOR, connect a null modem cable from **MODEM PORT 1** on the transmitter controller to the **MODEM PORT** on the PREDATOR.

LOG PRINTER CABLE CONNECTIONS.

If transmitter site logging is desired, a printer must be connected to the transmitter rear-panel **J7 PRINTER** port. A log is a collection of transmitter data. The transmitter data included in the log consists of forward/reflected power, transmitter efficiency, plate supply parameters, screen supply parameters, grid supply parameters, dissipation, IPA parameters, and exciter parameters. The log printer can be almost any available printer such as a dot matrix or laser. To connect a printer to the transmitter, proceed as follows:

1. To attach a log printer to an RTDS transmitter, proceed as follows:

A. Locate a printer and a printer cable to be connected to the transmitter.

B. Connect the printer cable from the printer to the **J7 PRINTER** port on the transmitter controller rear-panel.

2. Repeat the procedure for each RTDS transmitter to be configured for logging operation.

CONNECTIONS – LOG PRINTER

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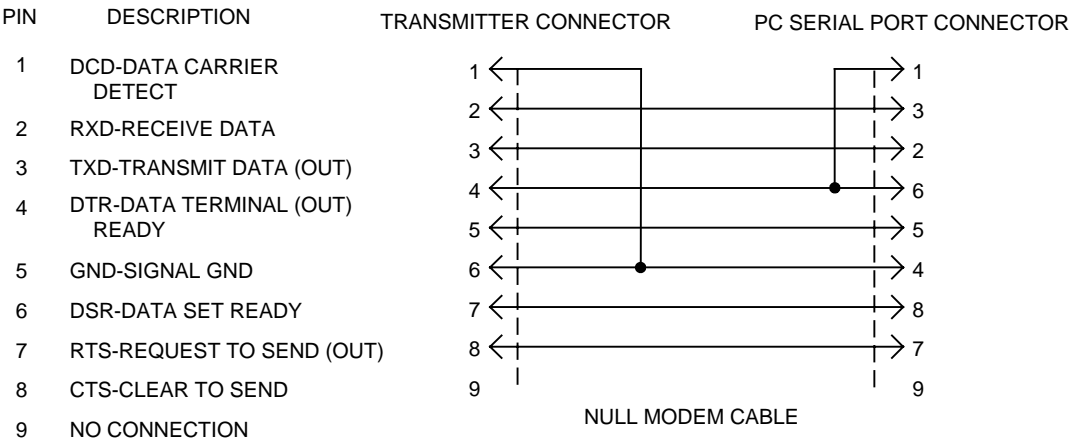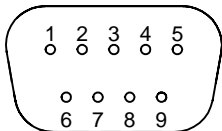**STUDIO/CONTROL LOCATION DIAL-UP MODEM INSTALLATION.**

The studio/control location RTDS PC will also require the installation of a dial-up modem. RTDS is designed with the ability to use almost any internal or external modem available on the market.

A list of recommended modems is presented in MODEM SETUP. If a modem is to be purchased for the PC, refer to MODEM SETUP select a modem from the list. To install the modem, perform the installation instructions in the manual for the Windows 95 operating system. Ensure Windows 95 recognizes the modem. If Windows 95 does not recognize the modem, the modem will not work with RTDS.

NULL MODEM CABLE.

Many RTDS communication system connections require a null modem cable. Null modem cables can be purchased from a computer warehouse store such as Black Box. A null modem cable can be constructed if desired. Refer to the following illustration and construct a null modem cable using the following components:

1. 8-conductor 24 AWG cable with shield such as Belden 9538.

2. 9-pin D-type connector shells such as Robins Nugent DDM-9-365-BSK1.

3. 9-pin D-type female connectors such as Amp 205203-3.

PIN	DESCRIPTION
1	DCD-DATA CARRIER DETECT
2	RXD-RECEIVE DATA
3	TXD-TRANSMIT DATA (OUT)
4	DTR-DATA TERMINAL (OUT) READY
5	GND-SIGNAL GND
6	DSR-DATA SET READY
7	RTS-REQUEST TO SEND (OUT)
8	CTS-CLEAR TO SEND
9	NO CONNECTION

NULL MODEM CABLE

RTDS74

NULL MODEM CABLE

TELEPHONE LINE PROTECTION.

For any RTDS communication system using a telephone line, it is strongly recommended the transmitter site and the control locations be equipped with telephone line protection devices. A telephone line protection device prevents damage to telephone line equipment from large surges/spikes such as lightning.

Typical telephone line protection devices include the SurgeMaster and SurgeMaster II. These units are combination ac line and telephone line protection devices. The SurgeMaster has a rating of 550 joules and a $10,000 warranty for equipment connected to the device. The SurgeMaster II has a rating of 1325 joules and a $25,000 warranty for equipment connected to the device. Both units can be purchased from a local office supply store such as Staples or Walmart.

DIRECT CONNECT OPERATION - MODEM PORT 1.

Direct connect– MODEM PORT 1 operation is to be used during a visit to the transmitter site. With this mode of operation, the user has direct access to the transmitter with no user security features such as login. The security system is bypassed when an RTDS computer is connected to **MODEM PORT 1**.

The port is enabled if: 1) jumper P8G on the controller circuit board is installed and 2) a dial-up user is not connected to **J5 MODEM PORT 2**. In a dial-up communication system, the dial-up user connected to **J5 MODEM PORT 2** has control priority. For example, if a user is controlling the transmitter from **MODEM PORT 1** and a second user dials/connects to the transmitter, RTDS will switch control of the transmitter to the dial-up user and commands from the **MODEM 1** port user will be ignored.

In "daisy chain" transmitter configurations, connect the PC directly to transmitter A. This will allow the user to access all the transmitters in the chain. If the transmitter A ac power is disconnected such as during a failure or repair condition, "daisy chain" communication will be disabled. To re-establish control: 1) move the modem or direct connect control line to the transmitter B **J5 MODEM PORT 2** receptacle and 2) install jumper P8G on the controller circuit board in transmitter B. Transmitter B will now be transmitter A and the remaining transmitters in the "daisy chain" will increment one letter. Connect the PC to the new transmitter A and the remaining transmitters can be accessed. When transmitter A is repaired, re-configure the "daisy chain" by: 1) moving the modem or direct connect control line to the transmitter A **J5 MODEM PORT 2** receptacle, 2) re-connecting the cable to the transmitter B **J5 MODEM PORT 2** receptacle, and 3) removing jumper P8G on the controller circuit board in transmitter B.

➢ To control the transmitter using direct connect **MODEM PORT 1** operation, proceed as follows:

NOTE	ALL REMOTE CONTROL AND MODEM PORT 1 OPERATION IS DISABLED WHEN THE REMOTE DISABLE SWITCH/INDICATOR IS ILLUMINATED. ENSURE THE REMOTE DISABLE SWITCH/INDICATOR IS EXTINGUISHED.

1. In "daisy chain" transmitter configurations, connect the PC to the transmitter A front-panel **MODEM PORT 1** receptacle using a null modem cable. For a single transmitter system, connect the PC to the front-panel **MODEM PORT 1** receptacle using a null modem cable.

2. Operate the controller **REMOTE DISABLE** switch/indicator to extinguish the switch/indicator.

3. On the RTDS transmitter front-panel screen, click **CONNECTION**.
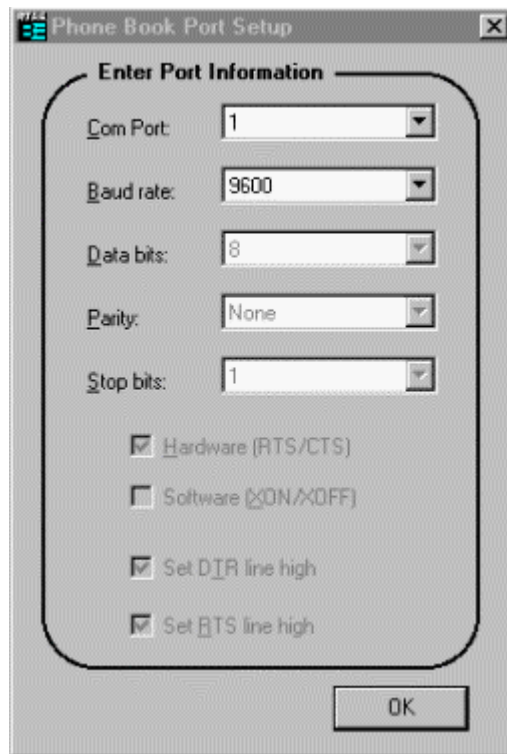
   *The **CONNECTION** menu appears.*
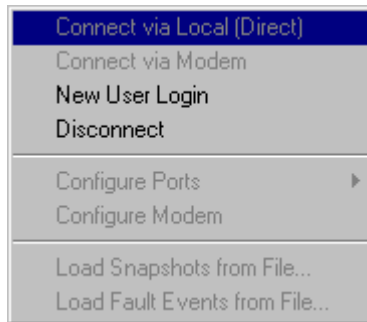
CONNECTION MENU – SINGLE TRANSMITTER SYSTEM

4. For first-time connections, the computer COM port must be selected. To select the COM port, proceed as follows:

   A. In the **CONNECTION** menu, move the cursor to **CONFIGURE PORTS → LOCAL** and click.

   *The **PORT SETUP** dialog box appears.*

RTDS47

PORT SETTINGS DIALOG BOX

   B. The **PORT SETTINGS** dialog box contains several parameters such as **COM PORT**. The **COM PORT** and **BAUD RATE** are the only two parameters that can be changed. The baud rate can be changed; however, the rate is changed only when a connection can not be established. A connection may be established if the baud rate is manually lowered to a specific rate such as 9600 or 2400.

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The **DATA BITS**, **PARITY**, **STOP BITS**, **HARDWARE (RTS/CTS), SOFTWARE (XON/XOFF), SET DTR LINE HIGH,** and **SET RTS LINE HIGH** display only the parameter assignments. The assignments can not be changed. To change the COM port and baud rate, proceed as follows:

1. In the **COM PORT** list box, use the list box arrow to view and select the COM port connected to the transmitter.

2. In the **BAUD RATE** list box, use the list box arrow to view and select the communication baud rate.

3. Click **OK**.

5. From the RTDS transmitter front-panel screen, click **CONNECTION**.

6. Select **CONNECT VIA LOCAL (DIRECT).**

The computer will connect to the transmitter. The transmitter front-panel screen controls and indicators will illuminate.
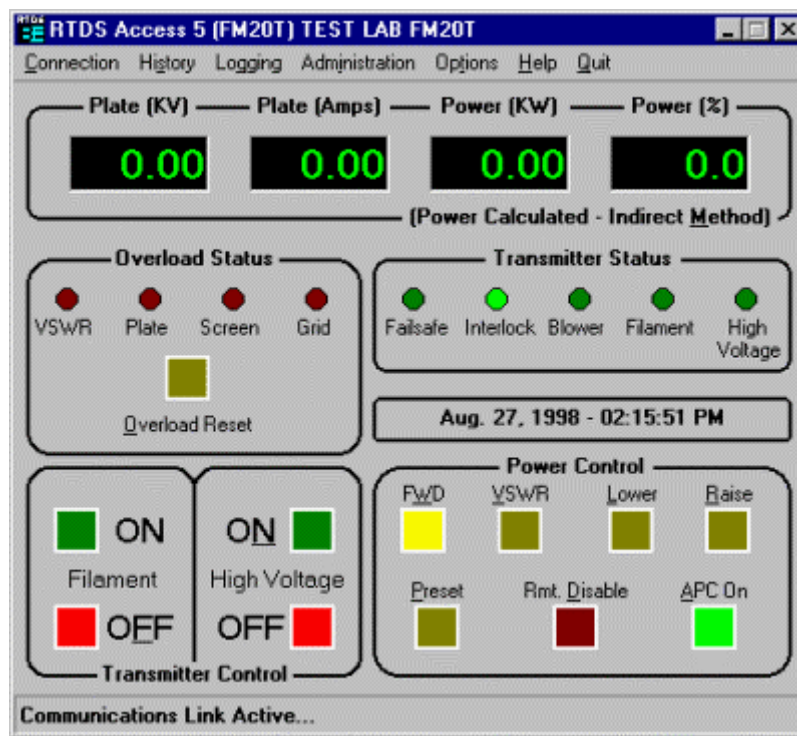
TRANSMITTER FRONT-PANEL SCREEN – CONNECTION

7. When finished, proceed as follows:

A. On the RTDS transmitter front-panel screen, click **CONNECTION**.

*The **CONNECTION** menu appears.*

B. Click **DISCONNECT**.

OVERLOAD/TIMEOUT SETUP.

RTDS is designed with the ability to control the transmitter overload and timeout adjustments. When RTDS is installed in the field, the overload and timeout values must be entered immediately following the initial connection procedure. Ensure the values are entered into RTDS immediately to protect the transmitter from possible damage. If RTDS is installed at the factory, the values are entered during final test.

The transmitter overloads and timeouts are presented on a tab page. The overload section of the tab page is equipped with two windows. One window displays the controller A/D numbers for the overloads. The other window displays the overload values in electrical units such as Amperes. Typically, the A/D windows are used only during a field installation to initially enter data from the old controller microprocessor module. Normal value entry is performed using the electrical unit windows.

➢ To adjust the transmitter overloads and timeouts, proceed as follows:

CAUTION	TO PREVENT POSSIBLE DAMAGE TO THE TRANSMITTER DURING RTDS FIELD INSTALLATION, ENSURE THE TRANSMITTER OVERLOADS AND TIMEOUTS ARE ENTERED IMMEDIATELY FOLLOWING THE INITIAL CONNECTION.

CAUTION	FAILURE TO ENTER THE CORRECT OVERLOAD VALUES MAY CAUSE SERIOUS DAMAGE TO THE TRANSMITTER. ENTER THE APPROPRIATE OVERLOAD VALUES AS DETERMINED BY THE TRANSMITTER MODEL.

1. On the transmitter controller front-panel screen, click **ADMINISTRATION**.
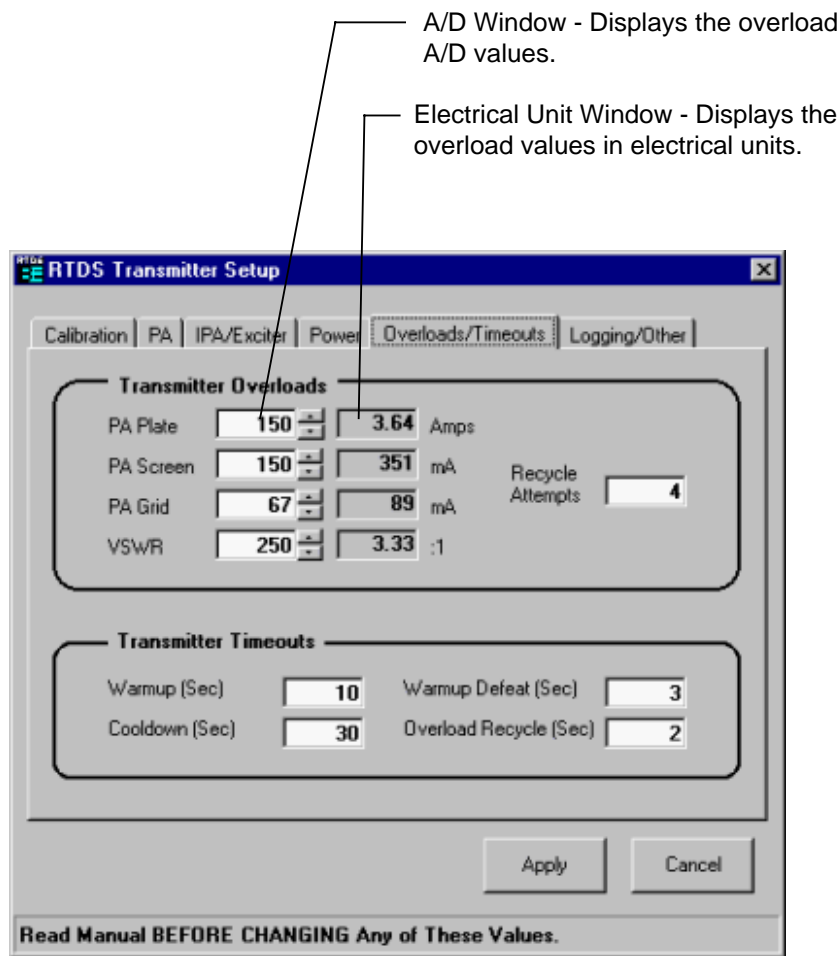
   *The **ADMINISTRATION** menu appears.*

2. In the **ADMINISTRATION** menu, click **TRANSMITTER SETUP**.

   *The **TRANSMITTER SETUP** tab pages appear.*

3. Click the **OVERLOAD/TIMEOUTS** tab.

   *The **OVERLOAD/TIMEOUTS** tab page will appear.*

A/D Window - Displays the overload
A/D values.

Electrical Unit Window - Displays the
overload values in electrical units.

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OVERLOAD/TIMEOUTS TAB PAGE

NOTE	FOR FIELD INSTALLATIONS, THE TRANSMITTER OVERLOADS AND TIMEOUTS ARE RECORDED JUST PRIOR TO REMOVING THE STANDARD CONTROLLER MICROPROSSOR MODULE. LOCATE THE DATA AND ENTER THE VALUES DURING THE FOLLOWING PROCEDURES.
NOTE	THE VALUES RECORDED ARE THE A/D NUMBERS. ENTER THE VALUES IN THE A/D WINDOW. THE VALUES CAN BE ASSIGNED USING THE SPIN BUTTONS OR THE KEYBOARD.

4. Determine the PA plate overload. The plate overload monitors plate current for out-of-tolerance conditions. Plate overload default and range information is presented in the following table.   Enter the PA plate overload by performing the following procedure.

PA PLATE OVERLOAD

PARAMETER	FM-5T	FM-10T	FM-20T	FM-30T	FM-35T
PA Plate Overload Default	0.2 A	0.5 A	0.5 A	0.5 A	0.5 A
PA Plate Overload Range	0.1 to 1.7 A	0.1 to 3.3 A	0.1 to 4.3 A	0.1 to 5.3 A	0.1 to 5.3 A

A. Select a plate overload limit.

B. In the **PA PLATE (AMPS)** (electrical unit) data field, enter the plate overload in Amps.

5. Determine the PA screen overload. The screen overload monitors screen current for out-of-tolerance conditions. Screen overload default and range information is presented in the following table. Enter the PA screen overload by performing the following procedure.

PA SCREEN OVERLOAD

PARAMETER	FM-5T	FM-10T	FM-20T	FM-30T	FM-35T
PA Screen Overload Default	145 mA	145 mA	280 mA	450 mA	450 mA
PA Screen Overload Range	100 to 190 mA	100 to 190 mA	230 to 330 mA	400 to 500 mA	400 to 500 mA

A. Select a screen overload limit.

B. In the **PA SCREEN (MA)** (electrical unit) data field, enter the screen overload in mAmps.

6. Determine the PA grid overload. The grid overload monitors grid current for out-of-tolerance conditions. Grid overload default and range information is presented in the following table. Enter the PA grid overload by performing the following procedure.

PA GRID OVERLOAD

PARAMETER	FM-5T	FM-10T	FM-20T	FM-30T	FM-35T
PA Grid Overload Default	110 mA	110 mA	110 mA	110 mA	110 mA
PA Grid Overload Range	80 to 110 mA	80 to 110 mA	80 to 110 mA	80 to 110 mA	80 to 110 mA

A. Select a grid overload limit.

B. In the **PA GRID (MA)** (electrical unit) data field, enter the screen overload in mAmps.

7. Determine the PA reflected power overload. The reflected power overload monitors reflected power for out-of-tolerance conditions. Reflected power overload default and range information is presented in the following table. Enter the PA reflected power overload by performing the following procedure.

VSWR OVERLOAD

PARAMETER	FM-5T	FM-10T	FM-20T	FM-30T	FM-35T
PA Reflected Power Overload Default	3.0 : 1	3.0 : 1	3.0 : 1	3.0 : 1	3.0 : 1
PA Reflected Power Overload Range	2.1 : 1 to 3.5 : 1	2.1 : 1 to 3.5 : 1	2.1 : 1 to 3.5 : 1	2.1 : 1 to 3.5 : 1	2.1 : 1 to 3.5 : 1

A. Select a VSWR overload limit.

B. In the **VSWR (1)** (electrical unit) data field, enter the VSWR overload.

8. Determine the number of recycle attempts. A recycle attempt is an automatic response sequence to an overload by the transmitter controller. A recycle attempt operates the high voltage to off–then–on to allow the condition which prompted the overload to clear. The number of recycle attempts determines when the transmitter will cycle off-the-air and must be manually reset. For example, the recycle attempts limit is set to 4 and a plate overload occurs. The transmitter recycles and if no further overloads occur during a 60 second interval, the transmitter will return to operation. If four overload recycle attempts occur during a 60 second interval, the transmitter will cycle off-the-air and must be manually reset. The recycle attempts default and range information is presented in the following table. Enter the number of recycle attempts by performing the following procedure.

RECYCLE ATTEMPTS

PARAMETER	FM-5T	FM-10T	FM-20T	FM-30T	FM-35T
Recycle Attempts Default	4	4	4	4	4
Recycle Attempts Range	0 to 4	0 to 4	0 to 4	0 to 4	0 to 4

  A. Select a recycle attempt limit.

  B. In the **RECYCLE ATTEMPTS** data field, enter the number of attempts.

9. Determine the warm-up time. The warm-up time controls the filament heating delay prior to the application of high voltage. The warm-up time default and range information is presented in the following table. Enter the warm-up time by performing the following procedure.

WARM-UP TIME

PARAMETER	FM-5T	FM-10T	FM-20T	FM-30T	FM-35T
Warm-Up Time Default	10 Sec	10 Sec	10 Sec	10 Sec	10 Sec
Warm-Up Time Range	10 to 270 Sec	10 to 270 Sec	10 to 270 Sec	10 to 270 Sec	10 to 270 Sec

  A. Select a warm-up time.

  B. In the **WARMUP (SEC)** data field, enter the time in seconds.

10. Determine the warm-up defeat time. The warm-up defeat time controls the length of time the filaments can be off before a new filament warm-up cycle is initiated. The warm-up defeat time default and range information is presented in the following table. Enter the warm-up defeat time by performing the following procedure.

WARM-UP DEFEAT TIME

PARAMETER	FM-5T	FM-10T	FM-20T	FM-30T	FM-35T
Warm-Up Defeat Time Default	3 Sec	3 Sec	3 Sec	3 Sec	3 Sec
Warm-Up Defeat Time Range	1 to 15 Sec	1 to 15 Sec	1 to 15 Sec	1 to 15 Sec	1 to 15 Sec

  A. Select a warm-up defeat time.

  B. In the **WARMUP DEFEAT (SEC)** data field, enter the time in seconds.

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11. Determine the tube cool-down time. The cool-down time controls the blower run-down interval after the filament voltage is off. The cool-down time default and range information is presented in the following table. Enter the cool-down time by performing the following procedure.

COOL-DOWN TIME

PARAMETER	FM-5T	FM-10T	FM-20T	FM-30T	FM-35T
Cool Down Time Default	30 Sec	30 Sec	30 Sec	30 Sec	30 Sec
Cool Down Time Range	30 to 270 Sec	30 to 270 Sec	30 to 270 Sec	30 to 270 Sec	30 to 270 Sec

A. Select a tube cool-down time.

B. In the **COOLDOWN (SEC)** data field, enter the time in seconds.

12. Determine the overload recycle time. The overload recycle time controls the amount of time the transmitter will remain deenergized to allow an overload to dissipate. The overload recycle time default and range information is presented in the following table. Enter the overload recycle time by performing the following procedure.

OVERLOAD RECYCLE TIME

PARAMETER	FM-5T	FM-10T	FM-20T	FM-30T	FM-35T
Overload Recycle Time Default	2 Sec	2 Sec	2 Sec	2 Sec	2 Sec
Overload Recycle Time Range	0.1 to 15 Sec	0.1 to 15 Sec	0.1 to 15 Sec	0.1 to 15 Sec	0.1 to 15 Sec

A. Select an overload recycle time.

B. In the **OVERLOAD RECYCLE (SEC)** data field, enter the time in seconds.

13. When all the data has been entered, click **APPLY.**

14. If a problem is discovered, the entered data can be discarded. Click **CANCEL** to not save any entered data.

METER CALIBRATION.

The RTDS controller front-panel and detailed reading screens are equipped with digital meter displays. To provide accurate meter indications, the RTDS meter displays must be calibrated to the transmitter meters. Meter calibration can be accomplished: 1) using the meter calibration tab page or 2) double-clicking a meter display on the detailed readings screen. Use the following procedures to calibrate the meters.

METER CALIBRATION PROCEDURE – METER CALIBRATION TAB PAGE.

➢ To calibrate the meters using the meter calibration tab page, proceed as follows:

1. On the RTDS transmitter front-panel screen, click **ADMINISTRATION**.

*The **ADMINISTRATION** menu appears.*

2. In the **ADMINISTRATION** menu, click **TRANSMITTER SETUP**.

*The **TRANSMITTER** SETUP tab pages appear.*

METER CALIBRATION TAB PAGE

3. The CALIBRATION tab page contains the meters to be calibrated. To calibrate the meters, proceed as follows:

A. Calibrate the PA PLATE voltage meter as follows:

1. Observe the transmitter PA plate voltage meter value.

2. In the **PLATE (kV)** data field, enter the transmitter PA plate voltage in kV.

B. Repeat the procedure for the remaining meter displays. Ensure the data is entered using the appropriate meter value units. For example, the PA plate voltage value must be entered in kV. The following text presents the meter displays and appropriate meter value units.

- PA Plate Voltage − kVolts.
- PA Screen Voltage − Volts.
- PA Grid Voltage − Volts.
- PA Power − kWatts.
- PA Exhaust Temperature - F° or C° as selected by the Fahrenheit or Celsius select buttons.
- Exciter Power (forward) − Watts.
- Exciter Reflected Power − Watts.

If the transmitter is equipped with an IPA:

- IPA Volts − Volts.
- IPA Power − Watts.
- IPA Current − Amps.
- IPA Reflected Power − Watts.

4. When all the meter values have been entered, click **APPLY**.

5. If a problem is discovered, the entered data can be discarded. Click **CANCEL** to not save any entered data.

METER CALIBRATION PROCEDURE − DETIALED READINGS SCREEN.

A meter on the detailed readings screen can be calibrated by double-clicking the display and using the spin buttons to enter a value. The double-click meter display calibration procedure can be used on all meters with the exception of the DISSIPATION and PA TEMP meters on the detailed reading screen. These meters are calculated by RTDS.

➢ To calibrate the meters by double-clicking the meter display, proceed as follows:

1. Select a meter display to be calibrated such as the plate voltage display.

2. Double-click the meter display.

The screen will pause and two spin buttons will appear.
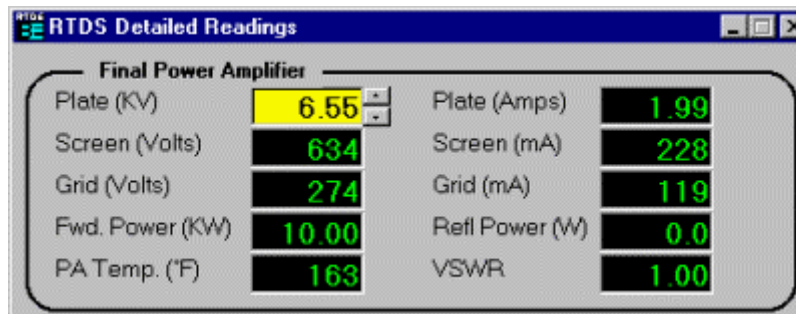
DETAILED READING SCREEN

RTDS20A/B

METER CALIBRATION − DOUBLE-CLICK USING MOUSE

3. Use the spin buttons to enter the desired value.

4. When finished, double-click the meter display.

The screen will return to normal operation.

ASSIGNING USERS.

Access to a transmitter site is controlled by a permission-based security system. The system allows a user to log into a site if an approved password is entered. Once a user logs into a site, the user can perform only permitted functions such as reading the transmitter meter displays and indicators. For example, radio station user Jim is assigned permission to only read the transmitter meter displays and front-panel indicators. When Jim logs in, he will be able to only read only the transmitter meter displays/indicators and perform no other functions.

The permitted functions are divided into 4 categories: 1) readings only, 2) basic control, 3) full control and remote disable override, and 4) administrator. The following text presents a description of the categories. If the user does not have permission to perform a function, the dialog box will be grayed-out. Up to 10 users can be assigned to a site.

- Readings Only - Allows a user to read the transmitter meter displays and indicators. Typical users to be assigned readings only permission include on-air personalities.

- Basic Control – Permits a user to perform the following:
  1) View the meter displays.
  2) Basic transmitter control functions such as ON/OFF and RAISE/LOWER.
  3) Snapshot operation.
  4) Logging operation.
  Typical users to be assigned basic control permission include on-air personalities and technicians.

- Full Control – Permits a user to perform the following:
  1) View the meter displays.
  2) Basic transmitter control functions such as ON/OFF and RAISE/LOWER.
  3) Snapshot operation.
  4) Logging operation.
  5) Transmitter setup such as transmitter warning setpoints.
  6) Remote control disable override.
  Typical users to be assigned full control permission include engineers.

- Administrator – Permits a user to perform all RTDS operations, which includes the following:
  1) View the meter displays.
  2) Basic transmitter control functions such as ON/OFF and RAISE/LOWER.
  3) Snapshot operation.
  4) Logging operation.
  5) Transmitter setup such as transmitter warning setpoints.
  6) Remote control disable override.
  7) The ability to delete or change site assignments users.
  Typical users to be assigned administrator permission include chief engineers and general managers. One administrator must be assigned to each site.

When a user is assigned to a site, the user is assigned a password. The password is case sensitive and can: 1) contain up to 8 characters and 2) be any printable character on the keyboard.

Typically, users are assigned by the engineer at the transmitter site during the initial installation of RTDS. When users are assigned at the site, the engineer simply enters the user names and passwords using the following procedure. However, users can be assigned from a remote location during initial installation. If this is to be performed, a default user name and password will be required.

The following text presents the default user name and password. Use the default user name and password to access the site from a remote location if no other users have been assigned to the site. Enter the users by performing the following procedure. Ensure a minimum of one administrator is assigned to the site. Once an administrator is assigned to the site, the default password is automatically deleted by RTDS.

Default User Name - ADMINST (all upper case)
Default Password – ADMIN (all upper case)

➢ To assign users to a site, proceed as follows:
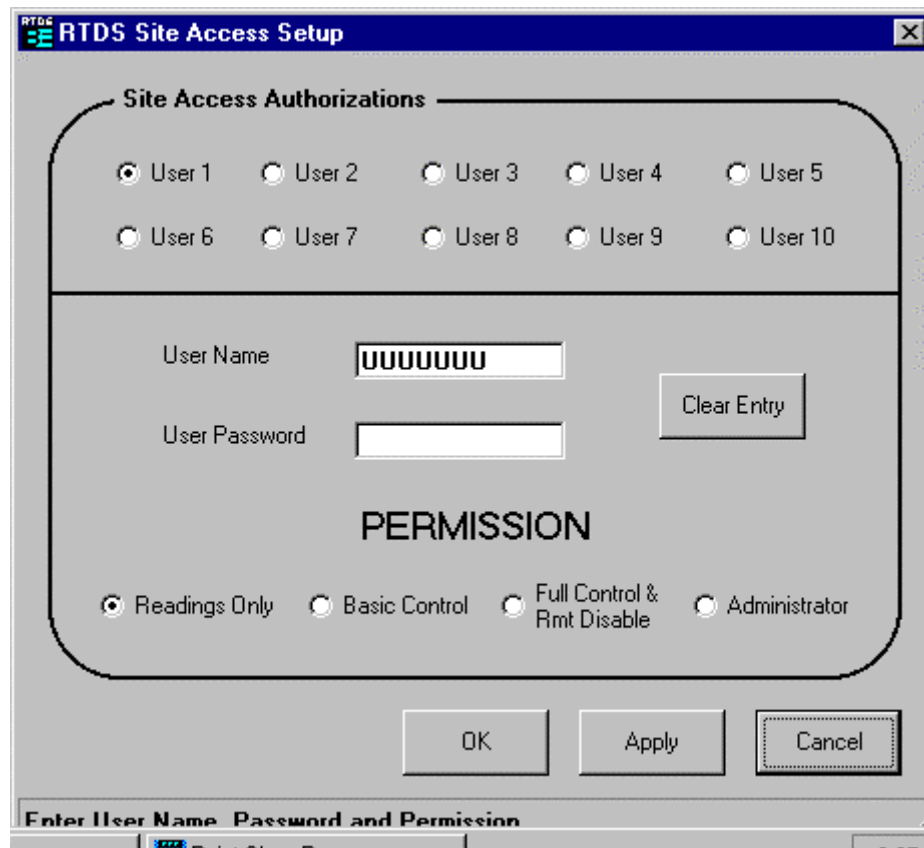
NOTE   THE ADMINISTRATOR IS THE ONLY PERMISSION WITH THE ABILITY TO ASSIGN USERS TO A SITE.

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1. On the transmitter controller front-panel screen, click **ADMINISTRATION**.

*The **ADMINISTRATION** menu appears.*

2. In the **ADMINISTRATION** menu, click **SITE ACCESS**.

*The **SITE ACCESS** dialog box appears.*

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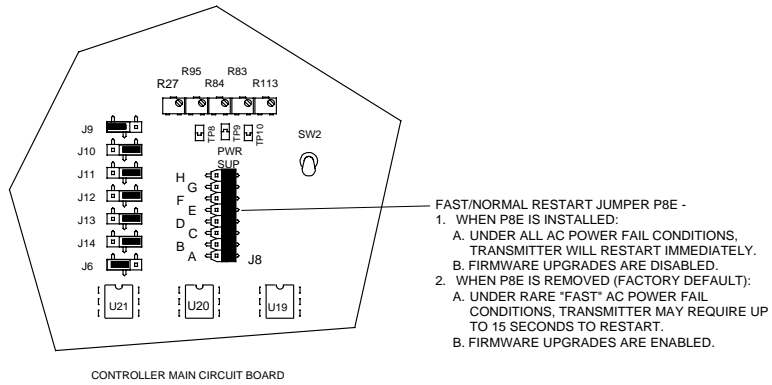***SITE ACCESS SETUP DIALOG BOX***

3. Assign a user as follows:

A. In the **USER** data field, select a user number. Up to 10 users can be assigned to a site.

B. In the **USER NAME** data field, enter the user name. The user name is case sensitive and can: 1) contain up to 8 characters and 2) be any printable character on the keyboard.

C. In the **USER PASSWORD** data field, enter the user password. The user password is case sensitive and can: 1) contain up to 8 characters and 2) be any printable character on the keyboard.

D. In the **PERMISSION** data field, select the desired user permission. The user can be assigned any combination of **READINGS ONLY, BASIC CONTROL, FULL CONTROL & RMT DISABLE**, or **ADMINISTRATOR** permissions.

E. Click **APPLY** to save the user assignment.

F. Repeat the procedure for each site user. Ensure one administrator is assigned to each site.

4. When all the users have been entered, click **OK.**

5. If a problem is discovered, the entered user data can be discarded. Click **CANCEL** to not save any entered user information.

6. A user name and password can be deleted using the **CLEAR ENTRY** button. To delete a user, proceed as follows:

A. In the **SITE ACCESS AUTHORIZATIONS** data field, select the desired user.

B. Click **CLEAR ENTRY**.

The user will be deleted.

FAST/NORMAL RESTART.

Jumper P8E on the transmitter controller main circuit board allows the transmitter to be configured for a fast or normal restart (refer to the following illustration). When P8E is removed (factory default): 1) under rare "fast" ac power fail conditions, the transmitter may require up to 15 seconds to restart and 2) firmware upgrades are enabled. When P8E is installed: 1) under all ac power fail conditions, the transmitter will restart immediately and 2) firmware upgrades are disabled. Refer to the following text and program jumper P8E as desired. It is recommended the jumper be installed only if "fast" ac power fail conditions occur frequently.

CONTROLLER MAIN CIRCUIT BOARD

FAST/NORMAL RESTART JUMPER P8E -
1. WHEN P8E IS INSTALLED:
   A. UNDER ALL AC POWER FAIL CONDITIONS,
      TRANSMITTER WILL RESTART IMMEDIATELY.
   B. FIRMWARE UPGRADES ARE DISABLED.
2. WHEN P8E IS REMOVED (FACTORY DEFAULT):
   A. UNDER RARE "FAST" AC POWER FAIL
      CONDITIONS, TRANSMITTER MAY REQUIRE UP
      TO 15 SECONDS TO RESTART.
   B. FIRMWARE UPGRADES ARE ENABLED.

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FAST/NORMAL RESTART JUMPER P8E LOCATION ON CONTROLLER MAIN CIRCUIT BOARD

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RTDS WARRANTY/REGISTRATION CARD

IBE

Station - _____ Purchase Date _____

Address -
    Street _____ Box No. _____

    City/Town _____ State _____

    Zip Code _____ Country _____

Primary Contact Person _____

Office Telephone Number _____-_____-_____

Transmitter Site Telephone Number _____-_____-_____

Software Version _____

Firmware Version _____

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RTDS WARRANTY/REGISTRATION CARD

Return card to:

Broadcast Electronics, Inc. - Quincy Facility
4100 N. 24th St. P.O. BOX 3606
Quincy, Illinois 62305

Attention: RF Customer Service Department