Model 820-220
RD-4
Remote Frequency Deviation Display

SERIAL NUMBER_____

January 31, 1982
Revision A

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CUSTOM OPTIONS/CONFIGURATIONS - Any Custom Options or Configurations are described starting at sheet ii.

SECTION ONE

GENERAL INFORMATION

1.1 SCOPE OF MANUAL

This manual contains the information necessary to operate and maintain the TrueTime model 820-220 RD-4 Remote Frequency Deviation Display.

1.2 PURPOSE OF EQUIPMENT

The Remote Time Deviation Display decodes serial RS-232 frequency deviation data and displays the decoded frequency deviation.

1.3 PHYSICAL SPECIFICATIONS

The physical specifications are:

Height:	6.83 in (17.35 cm)
Width:	30.42 in (77.27 cm) without mounting knobs
Depth:	3.75 in (9.53 cm) plus connectors
Weight:	Approximately 11 lb (5 Kg)

1.4 ENVIRONMENTAL SPECIFICATIONS

The environmental specifications are:

Operating Temperature:	0 to +50ºC (+32 to +122ºF)
Storage Temperature:	-40 to +70ºC (-40 to +158ºF)
Humidity:	95% relative, non-condensing
Cooling Mode:	Convection

1.5 POWER SPECIFICATIONS

The input power specifications are:

Voltage:	95 to 260 VAC
Frequency:	47 Hz to 440 Hz
Power:	Approximately 50 W
Connector:	CORCOM 6EF1

1.6 INPUT SIGNAL SPECIFICATIONS

The input signal specifications are:

Serial Data:	Frequency Deviation in Hz
Levels:	RS-232
Data Rate:	9600 bps
Stop Bits:	1
Data Bits:	7
Parity:	even
Connector:	Female 25-pin D subminiature
Mating Connector:	Male 25-pin D subminiature
Pin Assignment:	See Table 1-1

TABLE 1-1

PIN	ASSIGNMENT
1	Chassis ground
2	RXD
3	TXD
7	Signal ground

1.7 DISPLAY SPECIFICATIONS

The display specifications are:

Display:	5 7-segment-plus-decimal LED displays
Digit size:	4.0 in (2.5 cm)
Intensity:	14000 ucd minimum/segment
Range:	-9.999 to +9.999 Hz
Blanking:	Display blanks when input bad, lost or out-of-range

SECTION TWO

INSTALLATION AND OPERATION

2.1 INTRODUCTION

This section contains installation instructions and operating procedures.

2.2 INSTALLATION

Unpack the unit and carefully inspect it for shipping damage. Any damage must be reported to the carrier immediately.

If desired, mount the display on a wall or ceiling using the remote mounting kit provided.

Fabricate any required cables. Connect the RD-4 rear-panel connector to the "FTM" output on the 560 Distribution Frame. Note that the RXD output of the RD-4 connector duplicates its TXD input. This permits daisy chaining of several RD-4 units. Connect the power cord to the RD-4 rear-panel connector.

CAUTION! There are extremely dangerous voltages present in this unit. DO NOT remove the top cover without FIRST disconnecting the primary power! Only skilled technicians should access the inside of this unit.

2.3 OPERATION

Press the top of the rear-panel-mounted POWER switch. The numeric display will first illuminate all display segments and decimal points as a lamp test. At the end of the initialization sequence the display will show signed frequency deviation in Hertz translated from the input. Positive deviations are shown without a sign. The resolution is 1 mHz. The range is -9.999 to +9.999 Hz. An out-of-range deviation will cause the display to show dashes. If no input or incorrect input is present, the display will blank. If the FTM Mark II has not synchronized to system time and achieved 1 Hz lock, the display will show all decimal points. No user intervention other than applying power to the display is required.

SECTION THREE

THEORY OF OPERATION

3.1 INTRODUCTION

The RD-4 Remote Display is composed of a rear case containing a two Power Supply Assemblies, an 800-5079-1 Decoder Assembly and two 800-5096 Display Assemblies.

3.2 CIRCUIT CARD DESCRIPTIONS

The circuits of each of these card Assemblies are explained in the Circuit Card Descriptions on the following pages.

SECTION FOUR

MAINTENANCE AND TROUBLESHOOTING

4.1 INTRODUCTION

Effective maintenance and troubleshooting of this system requires a thorough understanding of equipment characteristics, operating procedures, theory of operation and knowledge of both linear and logic circuit elements. The equipment characteristics, operating procedures and the theory of operation for the system processor are provided in Section through 3 of this manual.

4.2 PREVENTIVE MAINTENANCE

A systematic preventative maintenance routine will reduce the possibility of a malfunction. This routine should include inspection, qualification and cleaning of the instrument.

4.2.1 INSPECTION

CAUTION: Disconnect equipment from the primary power prior to inspection. Dangerous voltages are present that can cause serious injury or loss of life.

Exercise care when handling this equipment. It contains precision parts that can be damaged by improper handling. Do not touch connector pin surfaces. Foreign material deposited on contact surfaces can cause corrosion, resulting in equipment damage or failure. Inspect the unit for damaged components, loose or frayed connections and corrosion on metal surfaces. If damage is found, correct it immediately.

4.2.2 CLEANING

CAUTION Disconnect equipment from the primary power prior to cleaning. Dangerous voltages are present that can cause serious injury or loss of life.

Accumulations of dust and dirt can impair cooling and generally distracts from equipment appearance. A soft cloth and a commercial cleaner (such as Windex) may be used to clean the paint and the lens. Be careful not to get the cleaner into switches.

4.2.3 QUALIFICATION

Verify that the unit meets all of the applicable specifications listed in Section 1. Failure to meet a specification is an indication of malfunction and should be corrected immediately.

4.3 TROUBLESHOOTING

CAUTION: Only a qualified technician should attempt repair to this unit. Dangerous voltages are present that can cause serious injury or loss of life. The power supply in particular uses high voltages.

The following suggestions are general in nature. When followed, they will minimize equipment down time. Use these suggestions in conjunction with the drawings in Section 5 and the circuit descriptions in Section 3 to diagnose equipment malfunctions.

4.3.1 GENERAL TROUBLESHOOTING PROCEDURES

Since an apparent problem may actually be the result of operator error, misunderstanding or misuse, the technician will need a thorough understanding of the normal operation. Refer to Section 2 for a description of normal operation. Thoroughly evaluate the procedures used by the operator when the malfunction occurred.

4.3.2 POWER CIRCUITS

Verify that power supply is as specified. Verify that the primary power fuse has not blown and that primary power is present. Check external loads where applicable.

4.3.3 LOCATING DRAWINGS

Reduced drawings of all mechanical assemblies and circuit card schematics are located in Section 5 of this manual. The index contains a list of the drawings in this manual.

4.3.4 LOCATING CIRCUITS

Section 3 provides a written description of each circuit card. Use this information in conjunction with the schematics while troubleshooting.

4.3.5 CIRCUIT CARD REMOVAL

CAUTION: Disconnect equipment from the primary power prior to disassembly. Dangerous voltages are present that can cause serious injury or loss of life.

To remove a circuit card first remove the screws that secure the lid to the case. Remove the screws from the case which hold the spacers to the case. Lift the circuit cards and their spacers from the case. Reinstall the circuit cards in the same positions that they occupied before disassembly.

4.3.6 REPLACING COMPONENTS

It is imperative that the IC's are replaced with exactly the same type of component. Do not guess in this area. Use the parts lists to find the exact IC part number. Be sure not to bend under the IC legs when replacing them.

When replacing soldered components use a low temperature iron and be careful not to disturb the etch. Use a resin-core flux and clean the soldered joints carefully with alcohol. Do not allow the cleaner to penetrate the pots or switches.