crown
broadcast

RTC
Redundant Transmitter Controller

Operator Restart | Tx1RF Power Threshold | Tx2RF Power Threshold | VOX Attack Timeout | VOX Decay Timeout

Tx1AudioOn ☐ ☐ HeartBeat
Tx2AudioOn ☐ ☐ AntennaPos1
Tx1Fault ☐ ☐ AntennaPos2
Tx2Fault ☐ ☐ Shutdown

FM RTC
Redundant Transmitter Controller

User's Manual

Revision control

Revision	Print date
Revision 3	September 2002

Important Notices

Crown attempts to provide information that is accurate, complete, and useful. Should you find inadequacies in the text, please send your comments to the following address:

International Radio and Electronics
25166 Leer Drive, P.O. Box 2000
Elkhart, Indiana, 46515-2000 U.S.A.

Contents

Notes

Section 1-Getting Acquainted

This section provides a general description of the Crown Redundant Transmitter Controller and introduces you to safety conventions used within this document. *Review this material before installing the RTC.*

The RTC System

The Crown FM RTC Redundant Transmitter Control is a simple, easy to use solution for creating redundant broadcast transmitter systems. A complete redundant transmission system consists of the following:

- Two Crown Broadcast FM transmitters (FM30, FM100, FM250 or FM500)
- A Crown FM RTC system controller with interface cables
- An antenna switch

The FM RTC automatically switches from the primary to the secondary transmitter when any of the following conditions occur

- Loss of program audio
- When transmitter power drops below a preset limit for more than 4 seconds
- A fault in the transmitter.

Once the problem condition clears, the FM RTC returns the primary transmitter to operation.

Antenna Switch

An electrically operated RF switch switches transmitters in the system. The FM RTC continuously monitors the state of the antenna RF switch. If the antenna switch either fails to switch correctly or unexpectedly changes states, the Crown FM RTC disables both transmitter carriers until the station engineer corrects the problem and resets the system.
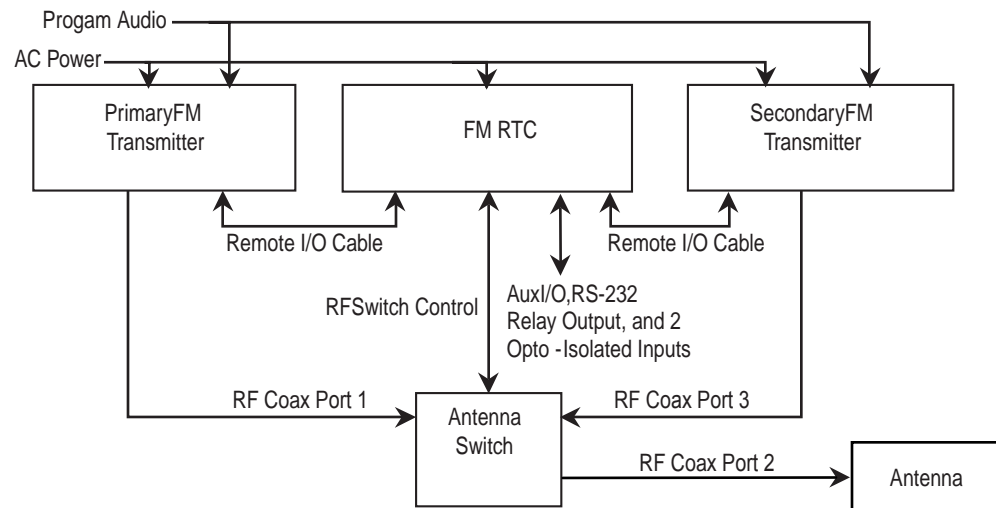
Transmitters

The Crown FM RTC interfaces directly with two Crown transmitters. All signals connect to the FM RTC through the transmitter Remote I/O connector on the back of the transmitter.

- Transmitter Composite Audio Output
- Meter RF Watts Output
- Carrier Enable
- Transmitter Fault Summary

Safety Considerations

Crown Broadcast assumes the responsibility for providing you a safe product and safety guidelines during its use. "Safety" means protection to all individuals who install, operate, and service the transmitter as well as protection of the transmitter itself. To promote safety, we use standard hazard alert labeling on the product and in this manual. Follow the associated guidelines to avoid potential hazard.

Dangers

DANGER represents the most severe hazard alert. Extreme bodily harm or death will occur if DANGER guidelines are not followed.

Warnings

WARNING represents hazards which could result in severe injury or death.

Cautions

CAUTION indicates potential personal injury or equipment or property damage if the associated guidelines are not followed. Particular cautions in this text also indicate unauthorized radio-frequency operation.

Type of Hazard

⚠WARNING

Severe shock hazard!

Turn power off and wait approximately 1 minute for capacitors to discharge before handling them.

Pictorial Indication of Hazard

Explanation of Hazard

Sample Hazard Alert
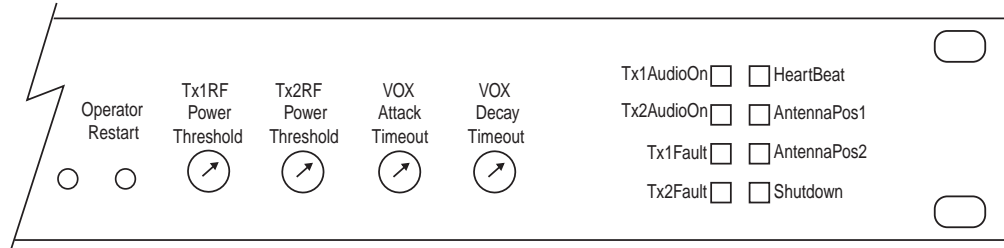
Front Panel Indicators

Eight front panel LED indicators display the status of the FM RTC system. The indicators are

Heartbeat LED-Green

Transmitter 1 "Tx1" Audio On - Green

Transmitter 2 "Tx2" Audio On - Green

Transmitter 1 "Tx1" Fault - Red

Transmitter 1 "Tx2" Fault - Red

Antenna Position 1-Yellow

Antenna Position 2-Yellow

Shutdown -Red

Heartbeat LED

The flashing green heartbeat LED is a visual indicator the FM RTC is operating correctly. The heartbeat led flashes about once per second.

Tx1 and Tx2 Audio On

The green Tx1 Audio On and Tx2 Audio On indicators display the condition of the primary and secondary transmitter's audio sources. When the green Audio On LED's are illuminated, the FM RTC is detecting an audio feed from the transmitters. A dark LED indicates a loss of audio signal. It is normal for the Audio On indicators to flash briefly as the audio sources change levels. The FM RTC rejects short-term loss of signal conditions by adjusting the VOX Attack and Decay timeout settings.
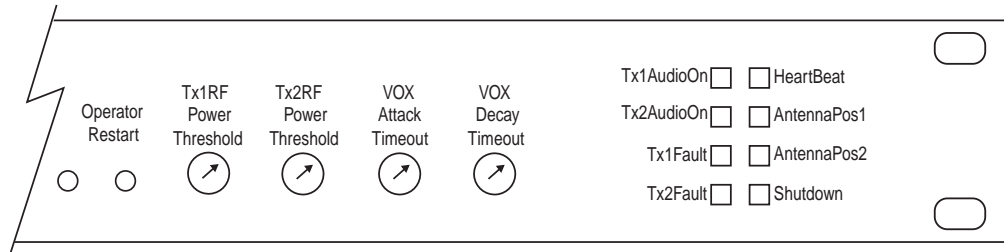
Tx1 and Tx2 Faults

The red Tx1 and Tx2 Fault indicators illuminate for the following conditions:

- A fault in the indicated transmitter. The exact fault is indicated on the transmitter's front panel.
- The RF output power for the indicated transmitter is below the level set by the FM RTC front panel threshold control.

When either of the fault conditions occur in the primary transmitter, the FM RTC switches to the secondary transmitter. If the secondary transmitter develops a fault while transmitting, the FM RTC shuts down both transmitters until either transmitter's fault condition clears.

Antenna Position 1 and 2

The yellow Antenna Position 1 and 2 indicators display the position of the antenna switch. If the antenna switch is unable to change switch positions, takes too long to change switch positions or unexpectedly switches positions, both the Antenna Position indicators and the Shutdown indicator flash to indicated an antenna switch fault. Press and release the System Reset button to clear an antenna position fault and restore the FM RTC to normal operation.

Shutdown

The red Shutdown LED alerts the operator to one of the following problems:

- An antenna switch position error. An antenna switch error usually requires operator intervention. Press and release the System Reset button to clear an antenna position fault and restore the FM RTC to normal operation.
- Both primary and secondary transmitters report a fault condition at the same time. The FM RTC automatically recovers from a shutdown condition caused by a transmitter fault condition when either the primary or secondary transmitter recovers and is able to resume operation.

Front Panel Controls

There are six front panel controls on the FM RTC. These controls are:

- Tx1 RF Power Threshold
- Tx2 RF Power Threshold
- VOX Attack Timeout
- VOX Decay Timeout
- System Reset
- Operator Restart

The following sections detail the operation and use of each of these controls.

System Reset

The System Reset is the only unlabeled control on the FM RTC front panel. Fault conditions, such as antenna relay switching problems or transmitter lock-outs require user intervention by resetting the RTC using this control.

Operator Restart

Operator Restart button has the following function on the FM RTC.

- Pushing and releasing Operator Restart switches the system between the primary and secondary transmitters. Switch between transmitters to exercise the RF antenna relay or verify the operation of the secondary transmitter.

VOX Timeout Settings

There are two VOX adjustments on the FM RTC which control switching after loss or return of audio.

- VOX Attack Timeout sets the length of time a loss of audio will trigger switching from the primary to secondary transmitter. The timeout is adjustable from 3 to 120 seconds.
- VOX Decay Timeout sets the time the audio signal must be present before the FM RTC switches from the secondary to the primary Transmitters. The timeout is adjustable from 3 seconds to 120 seconds.

Transmitter Power Threshold

The power threshold controls set the low power switching points on the FM RTC. The adjustments ranges from 5 to 500 watts.

- Tx1 RF Power sets the RF low power point where the FM RTC switches from the primary to the secondary transmitter. The rf power must drop below the threshold for longer than 4 seconds before the FM RTC switches to the secondary transmitter.

- Tx2 RF Power sets the RF low power point where the FM RTC shuts down the system if it is operating on the secondary transmitter. The secondary transmitter RF power must drop below the threshold for longer than 4 seconds before system shutdown.
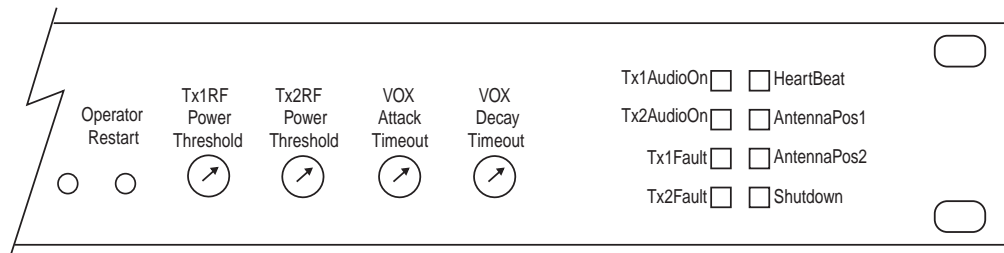
Section 2—Installation

This section provides important guidelines for installing your FM RTC. Review this information carefully for proper installation.

Unpacking

The Crown FM RTC is packed with the following items.

- FM RTC
- Two RF cables
- Two 15-pin interface cables
- Antenna relay with attached cable

Save the box and packaging material that the FM RTC was packed in should you need to return it for factory service.

Operating location

Install the Crown FM RTC in a standard component rack or on a suitable surface such as a bench or desk. The area should be clean and well ventilated.

Power connections

The FM RTC operates on 90-264 volts AC, 50-60 Hz single phase. Use the supplied EIA power cord to connect power to the FM RTC.

Mounting and connecting

1. Mount the transmitters in an equipment rack or other suitable enclosure. Connect transmitter power and program audio following instructions in transmitter's manual.
2. Mount FM RTC in rack or other suitable enclosure near the transmitters.
3. Mount antenna relay in the back of the rack.
4. Connect ground stud on back of FM RTC to station system ground.
5. Connect interconnect cables between transmitter interface connectors and transmitter IO connectors.
6. Connect the antenna relay to the relay connector on back of the FM RTC.
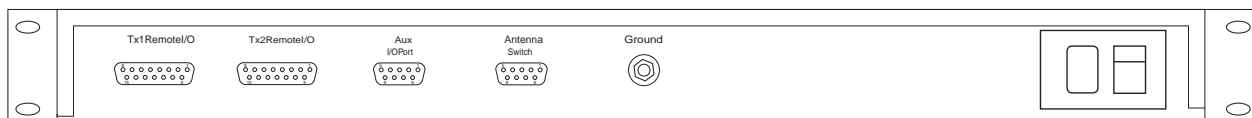
RF Connections

Refer to the following illustration for RF connections.

1. Connect coax cables from transmitters to antenna relay with supplied cables.

2. Connect the system antenna to the antenna relay.

3. Connect RF load (optional) to the antenna relay.

To antenna
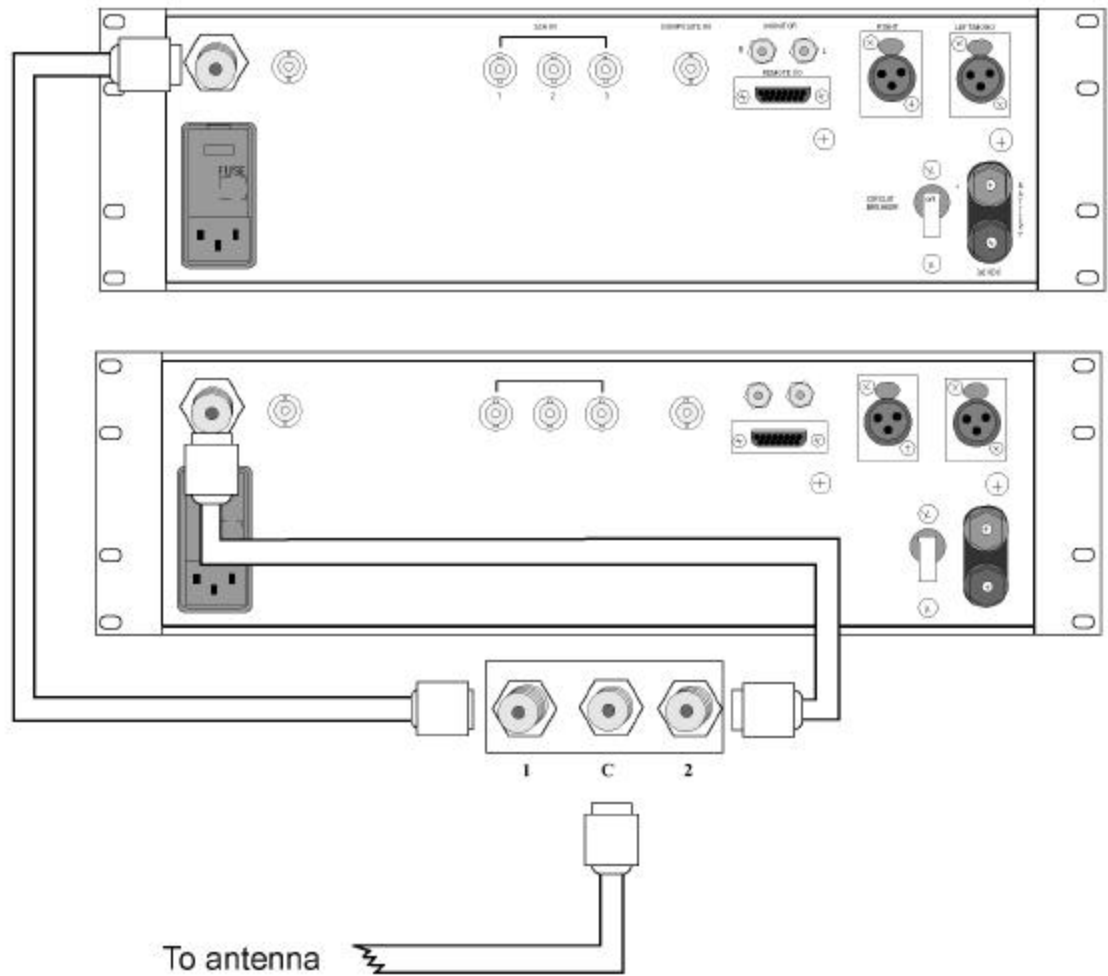
Section 3—Operation

This section provides general operating parameters of your transmitter and a detailed description of its front panel display.
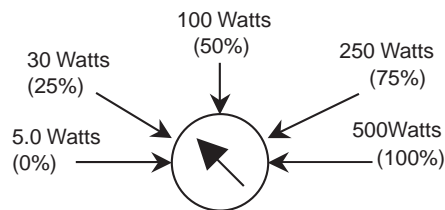
Start up sequence

This section describes the starting sequence for a Crown FM RTC system. Startup consists of two parts:
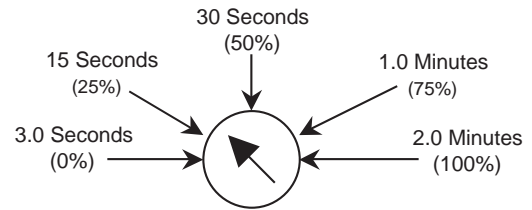
- Presetting controls
- Power up

Presetting controls

Before starting the FM RTC system, preset the following controls.

- Transmitter Power Threshold-Set below the maximum operating power of each transmitter.
- VOX Attack Timeout
- Vox Attack Delay Timeout

Power Threshold

100 Watts (50%)
30 Watts (25%)
250 Watts (75%)
5.0 Watts (0%)
500Watts (100%)

VOX Timeout

30 Seconds (50%)
15 Seconds (25%)
1.0 Minutes (75%)
3.0 Seconds (0%)
2.0 Minutes (100%)

Power up

The following steps describe the Crown FM RTC startup sequence. Before beginning the startup sequence, verify all connections.

1. Verify or set the power switch on the FM RTC to *off* (down).
2. Verify or set the transmitter carrier switches to *off*.
3. Verify or set the circuit breakers on the back of the transmitters on (up).
4. Set power switch on FM RTC to *on* (up). The front panel indicators will cycle through a startup sequence. The Heart Beat LED will flash regularly, about once per second.
5. Set transmitter carrier switches to *on* (up). The primary transmitter will begin to transmit.

End of day operation

At the end of the programming day, the FM RTC turns off both the primary and secondary transmitter carriers. This occurs only when both primary and secondary audio sources are lost or shut down. The FM RTC restores operation as soon as either or both audio sources are restored.

Section-4 Troubleshooting

This section provides guidelines for troubleshooting common problems that may occur with a Crown FM RTC system. The following subsections list tests and suggest corrective actions for each identified problem.

No heartbeat light, no operation,

If the Heartbeat LED does not flash and the FM RTC fails to operate, verify power to the FM RTC.

- Verify that AC power (90 to 264 Volts AC, 50-60 Hz) is present at the power cord.
- Verify that the power switch on the back of the FM RTC is turned on.
- Verify the state of the fuse. The fuse is located next to the power switch. If it is open, replace it with a 1/2 Amp, 250 Volt standard blow fuse.

If these checks fail to correct the problem or if the power fuse continues to fail, return the FM RTC for repair.

An Antenna Position Fault occurs when the FM RTC attempts to switch antenna positions and the antenna switch fails to respond within a 100 milliseconds. Faults are not likely to occur unless the antenna relay has been damaged by a lightning strike, excess power or a similar event. A faulty antenna switch cable or connector will also cause an antenna position fault.

- If a transient event caused the antenna switch fault, it will clear when you press and release the System Reset button.
- To verify that the antenna fault did not occur while trying to switch to the secondary transmitter:

  1. Disable the primary transmitter audio.
  2. Press and release the System Reset button.

  If the antenna fault occurs again, replace the antenna switch and reset the antenna switch interface. If these checks fail to correct the problem, return the FM RTC for repair.

No Audio Signal Detected

The FM RTC Tx1 and Tx2 Audio On indicators illuminate when the FM RTC is detecting audio from the transmitters.

Should the FM RTC indicate a loss of either audio source.

- Verify that the transmitter has program audio connected to the audio input.
- Verify that the transmitter output audio is connected to the FM RTC Remote I/O channel
- Verify that the audio level is approximately 12 volts peak-to-peak.

If these checks fail to correct the problem, return the FM RTC for repair.

Excessive or insufficient VOX time

VOX Attack and Decay time settings are front panel adjustable from 3.0 to 120 seconds. If the VOX Attack and Decay controls fail to adjust the appropriate timeouts, return the FM RTC for repair.

RF power settings

The Tx1 and Tx2 RF Power Threshold settings set the low power threshold from 5.0 to 500 watts. If the RF Power Threshold Adjust controls fail to adjust the appropriate levels, return the FM RTC for repair.

Tx1 or Tx2 fault locked out

The FM RTC features a fault counter for each of the transmitters. Should a transmitter experience a recurring fault, such as a SWR or RF Power fold-back, the faulting transmitter shall be locked out after the sixth fault/recovery/fault cycle. To prevent false transmitter fault lockouts, the counter is decremented every 4 minutes. In the event that a transmitter is fault locked out, either reset the FM RTC or press the System Reset button to resume operation.

Service

The product warranty (see opposite page) outlines our responsibility for defective products. Before returning a product for repair or replacement (our choice), call our Customer Service department using the following telephone number:

(866) 262-8917

Our Customer Service Representative will give you further instructions regarding the return of your product. Use the original shipping carton or a new one obtained from Crown. Place shipping spacers between the slide-out power amplifier assembly and the back panel. Please fill out the Factory Service Instructions sheet (page 7–5) and include it with your returned product.

24–Hour Support

In most instances, what you need to know about your product can be found in this manual. There are times when you may need more in-depth information or even emergency-type information. We provide 24–hour technical assistance on your product via a toll telephone call. For **emergency help** or **detailed technical assistance**, call

(866) 262-8917

You may be required to leave a message at this number but your call will be returned promptly from our on-call technician.

Spare Parts

To obtain spare parts, call **Crown Broadcast Service** at the following number.
(866) 262-8917

You may also write to the following address:

International Radio & Electronics Corporation

25166 Leer Drive

Elkhart, Indiana, U.S.A. 46514-5425

Three-Year Limited Warranty

North America Only

SUMMARY OF WARRANTY
We, Crown Broadcast, a business unit of International Radio and Electronics Company, Inc., 25166 Leer Drive, Elkhart, Indiana 46515–2000 warrant to the ORIGINAL PURCHASER of a NEW Crown Broadcast product, for a period of three (3) years from the date of purchase by the original purchaser (the "warranty period") that the new Crown Broadcast product is free of defects in materials and workmanship and will meet or exceed all advertised specifications for such a product. This warranty does not extend to any subsequent purchaser or user, and automatically terminates upon sale or other disposition of our product.

ITEMS EXCLUDED FROM THIS CROWN BROADCAST
We are not responsible for product failure caused by misuse, accident, or neglect. This warranty does not extend to any product on which the serial number has been defaced, altered, or removed. It does not cover damage to loads or any other products or accessories resulting from Crown Broadcast product failure. It does not cover defects or damage caused by use of unauthorized modifications, accessories, parts, or service.

WHAT WE WILL DO
We will remedy any defect, in material or workmanship (except as excluded), in our sole discretion, by repair, replacement, or refund. If a refund is elected, then you must make the defective or malfunctioning component available to us free and clear of all liens or other encumbrances. The refund will be equal to the actual purchase price, not including interest, insurance, closing costs, and other finance charges less a reasonable depreciation on the product from the date of original purchase. Warranty work can only be performed at our authorized service centers or at our factory. Expenses in remedying the defect will be borne by Crown Broadcast, including two-way surface freight shipping costs within the United States. (Purchaser must bear the expense of shipping the product between any foreign country and the port of entry in the United States and all taxes, duties, and other custom's fee(s) for such foreign shipments.)

HOW TO OBTAIN WARRANTY SERVICE
You must notify us of your need for warranty service not later than ninety (90) days after the expiration of the warranty period. We will give you an authorization to return the product for service. All components must be shipped in a factory pack or equivalent which, if needed, may be obtained from us for a nominal charge. Corrective actions will be taken within a reasonable time of the date of receipt of the defective product by us. If the repairs made by us are not satisfactory, notify us immediately.

DISCLAIMER OF CONSEQUENTIAL AND INCIDENTAL DAMAGES
You are not entitled to recover from us any consequential or incidental damages resulting from any defect in our product. This includes any damage to another product or products resulting from such a defect.

WARRANTY ALTERATIONS
No person has the authority to enlarge, amend, or modify this warranty. The warranty is not extended by the length of time for which you are deprived of the use of the product. Repairs and replacement parts are provided under the terms of this warranty shall carry only the unexpired portion of this warranty.

DESIGN CHANGES
We reserve the right to change the design of any product from time to time without notice and with no obligation to make corresponding changes in products previously manufactured.

LEGAL REMEDIES OF PURCHASER
There is no warranty which extends beyond the terms hereof. This written warranty is given in lieu of any oral or implied warranties not contained herein. We disclaim all implied warranties, including without limitation any warranties of merchantability or fitness for a particular purpose. No action to enforce this warranty shall be commenced later than ninety (90) days after expiration of the warranty period.

Crown Broadcast, International and Radio Company, Inc.

25166 Leer Drive, P.O. Box 2000, Elkhart, Indiana 46515–2000

Phone: (219) 262-8900; FAX: (219) 262-5399

Revised August 2001

Factory Service Instructions

To obtain factory service, complete the bottom half of this page, include it with the unit, and ship to:

International Radio & Electronics Corporation
25166 Leer Drive
Elkhart, Indiana, U.S.A. 46514-5425

For units in warranty (within 4 years of purchase from any authorized Crown Dealer): We pay for ground UPS shipments from anywhere in the continental U.S. and Federal Express Second Day service from Hawaii and Alaska to the factory and back to you. Expedited service/shipment is available for an additional charge. You may forward your receipt for shipping charges which we will reimburse. We do not cover any charges for shipping outside the U.S. or any of the expenses involved in clearing customs.

If you have any questions about your Crown Broadcast product, please contact Crown Broadcast Customer Service at:

Telephone: (866) 262-8917 or (866) 262-8972
Fax: (866) 262-8909

Name: Company:

Shipping Address:

Phone Number: Fax:

Model: Serial Number: Purchase Date:

Nature of the Problem
(Describe the conditions that existed when the problem occurred and what attempts were made to correct it.)

_____

_____

_____

_____

_____

_____

_____

Other equipment in your system: _____

If warranty has expired, payment will be: ☐ Cash/Check   ☐ VISA   ☐ Mastercard
                                    ☐ Please Quote before servicing

Card Number:_____ Exp. Date: _____ Signature: _____

Return Shipment Preference if other than UPS Ground: ☐ Expedite Shipment ☐ Other_____

ENCLOSE WITH UNIT—DO NOT MAIL SEPARATELY