APPENDIX 5

OPERATOR'S MANUAL

THREE (3) PAGE OPERATOR'S MANUAL FOLLOWS THIS SHEET

OPERATOR'S MANUAL
FCC ID: CN275GR1014T-xNB

APPENDIX 5

FCC REGULATIONS & COMPUTER SOFTWARE COPYRIGHTS

FCC REGULATIONS

FCC Regulations state that:

1. These DEVICES are approved by the FCC for licensed operation (depending on the model number). No modifications to the design are permitted. A station license is required by the FCC.

2. The RF power output of a radio transmitter shall be no more than that required for satisfactory technical operation considering the area to be covered and local conditions.

3. Frequency and deviation of a transmitter must be checked before it is placed into service and should be rechecked once each year thereafter.

⚠ Caution: The user of this equipment shall make no changes or modifications not expressly approved by CATTRON™ Doing so will void the user's authority to operate this equipment. Ref FCC 15.21.

COMPUTER SOFTWARE COPYRIGHTS

The CATTRON™ products described in this manual may include copyrighted CATTRON™ computer programs stored in semiconductor memories or other media. Laws in the United States and other countries preserve for CATTRON™ certain exclusive rights for copyrighted computer programs, including the exclusive right to copy or reproduce in any form the copyrighted computer program. Accordingly, any copyrighted CATTRON™ computer programs contained in the CATTRON™ products described in this manual may not be copied or reproduced in any manner without the express written permission of CATTRON™. Furthermore, the purchase of CATTRON™ products shall not be deemed to grant either directly or by implication, estoppel, or otherwise, and license under the copyrights, patents, or patent applications of CATTRON™, except for the normal non-exclusive, royalty free license to use that arises by operation of law in the sale of a product.

RADIO FREQUENCY (RF) RECEIVERS

The three models of RF receivers most often used with the MP96 are the R1014T1, the R1014T2, and the R1014T3H90NHX

R1014T1 RECEIVER

This is a 16 channel, UHF-synthesized RF receiver. The receiver incorporates a microprocessor and uses digital signal processing (DSP) techniques to selectively recover digital messages using CATTRON™ protocol.

The R1014T1 receiver has LED indicators for :

POWER ON
CARRIER DETECT (RF signal or carrier is present)
VCO LOCK (receiver locked on freq.)
DATA (received message data)
QSYNC (synchronization pulse)

Additionally, a rotary switch is provided to select one of up to 16 different **factory programmed** frequencies. The rotary switch can be changed while the receiver is on. All R1014T1 model receivers are shipped with a customer information sheet listing the programmed frequencies.

R1014T2 RECEIVER WITH LIQUID CRYSTAL DISPLAY (LCD)

This is a 30 channel, UHF-synthesized RF receiver. The receiver incorporates a microprocessor and uses Digital Signal Processing (DSP) techniques to selectively recover protocol messages. The front of the receiver has LED indicators for :

POWER ON
CARRIER DETECT (RF signal or carrier is present)
VCO LOCK (receiver locked on freq.)
DATA (received message data)
QSYNC (synchronization pulse)

The R1014T2 receiver has the capability to allow the user to select and program up to *14 different field programmable receive frequencies* in addition to the *16 factory preset frequencies*. These frequencies are programmed using the receiver's push-button switches and liquid crystal display (LCD). A user-friendly interface guides the operator through the menus to where the field programmable frequency table is selected and frequency values are programmed.

The R1014T2 receiver also has two pushbuttons for programming the following options: CloseStart™, Range Limiting™, Range Extender™, Field Frequencies, Scanner, and Attenuator.

CloseStart™

The CloseStart™ feature is intended as a safety feature which prevents the system from operating until the operator is close enough to the receiver to "unlock the system", allowing data messages into the decoder.

After system power up, CloseStart™ must be unlocked by receiving three (3) consecutive messages. These messages must have the same address (lock address) and a signal strength level that is greater than the preset CloseStart™ level. After CloseStart™ has been unlocked, received message data will pass to the decoder and the normal operating range of the system is restored. The CloseStart™ signal strength level can be adjusted, or CloseStart™ can be turned OFF.

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Range Limiting™
Range Limiting™ is a feature intended to keep the operator within a known operating distance of the receiver/decoder. Range Limiting™ operates by measuring the signal strength level of an incoming message and compares it against a preset Range Limiting™ level. When an out of range condition occurs, the received signal strength must become 3dBm greater than the range limit set level for any antenna to de-activate or reset the range limit output. The preset Range Limit level is set and adjusted using the push-button switches and LCD on the receiver.

Range Extender™
When Range Limiting™ is not in use, the receiver can be put into Range Extender™ mode. The Range Extender™ mode makes use of the triple diversity antenna arrangement. At the beginning of an incoming message, the signal strength is measured for each antenna.

The antenna with the strongest signal level is switched on and then used to receive the remainder of the message. This method ensures the best antenna will be used for receiving the controller's message data, thereby optimizing the distance or range of the system.

Scanner
The receiver can be placed in an automatic scan mode where either factory or field frequencies can be scanned, looking for valid transmitter data. Scanning is stopped on the desired channel by the MP96 decoder when it decodes the proper data (address, BCH, auxiliary functions, etc.).

Attenuator
An attenuator is a network for reducing signal level. In common terms, it helps to filter the "background noise" or "clutter" of distant, unwanted, weaker signals which may be on the same frequency. It is useful in applications where reduced range is desirable.

R1014T3H90 NHX
The R1014T3H90NHX receiver incorporates all of the same features of the R1014T2. Additionally, it has an RF transmitter for TALKBACK™ radio transmission of data.

TALKBACK™
TALKBACK™ is data transmitted from the machine via the MP96 decoder to the portable remote controller carried by the operator. A typical use of TALKBACK™ is a locomotive sending status information such as direction selected, engine alarms, throttle, and brake information to the controller. TALKBACK™ for cranes can include functions like "aligned" and weigh scale weight display. The controller must include a receiver and special software to display the functions sent from the machine via the MP96 decoder. TALKBACK™ features, frequency, data, etc., are controlled by the MP96 data processor. A separate transmit antenna is required. TALKBACK™ can be on the same RF channel or different than the receiver channel.

Field Programmable Memory (EEPROM)
The CATTRON™ MP96 system decoder has an Electrically Erasable - Programmable Read Only Memory (EE-PROM) IC which allows a limited amount of field changes to be made to the operation of the system.

A separate PC program must be written and used in order to set limits and allow the values to be changed into terminology pertinent to the application. For example, outputs 1 through 7 may be selected to change the output to a pulsed output that has a specific on time, off time, and run time duration. Limits are discussed with the user and incorporated in the PC program that downloads data to the CATTRON™ MP96 system decoder.

PRELIMINARY

ALIGNMENT INSTRUCTIONS
<u>R1014T Test Software</u>

1. Insert "**PDDCTB**" 3 ½" Disk in Computer"

2. Type "**DLMINST**" to run installation. The program will prompt with source and destination drive and directory. After you type in your response, the program will automatically install itself in your hard drive.

3. After installation, type "**DLM**" to invoke program. Insert test prom in socket X103 on the transceiver.

4. Connect serial port to transceiver and apply 12 VDC.

5. Access top menu bar by pressing "**F10**" key and go to "**SETUP**" option using "← " or "→" arrow keys.

6. Chose "**RF CALIBRATE**" option under "**SETUP**" menu by using "↑" or "↓" arrow keys and press "**ENTER**" key.

7. Program will ask for password.
   Type "**DLM**" and press "**ENTER**"

8. You should now be in "**RF CALIBRATE**" mode. Move cursor to transmit calibrate frequency block and enter test frequency in MHz. Repeat for receive calibrate frequency.

9. To activate transmitter, select "**XMIT CENTER**" for an <u>UNMODULATED CARRIER</u>, or select "**XMIT SQUARE**" for a <u>MODULATED CARRIER</u>.

10. To turn off transmitter, press any key.

11. Select "**REC MODE CAL**" option for receive mode.

2.0 kHz

APPENDIX 7

CIRCUITS AND DEVICES TO STABILIZE FREQUENCY

A 9.6 MHz reference TCXO and a PLL circuit establishes and stabilizes output frequency.