CARTEL

NBDOT – Ferry Crossing Light Controller

Integration Manual

Document #: 050-015-0044

Revision: 01

November 2007

Cartel Communication Systems Inc. • Langley, BC • Canada

Disclaimer

Cartel Communication Systems Inc. will not be held responsible for any damages, direct or indirect, arising from the use of our materials or from any other causes. Any liability whatsoever is hereby expressly limited to replacement or repair of defective materials.

This manual contains proprietary information that is the intellectual property of Cartel Communication Systems Inc. Reproduction, disclosure, modification or distribution, wholly or in part, without prior permission from Cartel Communication Systems Inc., is strictly prohibited.

Cartel Communication Systems Inc. is continuously working to improve system performance and expand product capabilities. Specifications and features contained within this document are subject to change without notice.

For additional copies of this publication contact:

Cartel Communication Systems Inc.
9415 – 202 Street
Langley, BC V1M 4B5
Canada

Tel. (604) 888-9711
Fax. (604) 888-9712
Toll Free: 1-800-663-0070
Website: www.cartelsys.com

PREFACE

This document describes the integration of several components to create the TA-FSB-NBDOT (Ferry-side) and the TA-FSC-NBDOT (Shore-side) controllers.

Hardware and software described in this document are subject to ongoing development and improvement. Consequently there may be minor discrepancies between the information in this document and the performance and design of the hardware and software.

CONTENTS

REVISION HISTORY

Revision	Date	Changes
R01	November 2007	• First Release

1. PRODUCT OVERVIEW

1.1. General Description

There are several water ferry crossings in New Brunswick, under the jurisdiction of NBDOT, which require a lighted notification system for ships traveling up and down the water ways. This notification system needs to be able to notify non-ferry vessels to proceed or halt based on the condition of cable system used to move the ferries across the width of the river. The Cable System which provides the motive force for the ferries, changes in height depending on the position of the ferry and can be damaged and can also cause damage by/to non-ferry vessels as they travel up and down the water way.

The Ferry Crossing Light Controller is designed to allow Ferry operators to control the signal light condition of their respective crossing from the bridge of their vessel using UHF Radio frequencies.

1.2. System Description - Theory of Operation

1.2.1 Assumptions

- Each Ferry to be equipped with a controller (antenna supplied by others)
- Each end (shore side) to a Ferry Crossing will have a control box and appropriate lighting (lighting and antenna supplied by others)
- Visual confirmation is all that is required for the operation of the system
- The Radios to be used are simplex radio's
- Radio & Antenna alignment are such that adjacent crossings and their respective ferries don't interfere with one another
- Power is supplied in the Ferry in the form of nominal +12VDC
- Power is supplied at each end of each crossing in the form of 120VAC 60Hz single phase
- Ferry Operators are responsible for selecting the correct crossing in the system.

1.2.2 Ferry-side operation

Figure 1: Ferry-side Controller Front Panel

Each Ferry will have a Ferry-side controller installed. The Ferry-side controller front panel consists of a Crossing Selector, a “Red Light” button and a “Green Light” button.

The Ferry-side controller is used to operate the Red or Green light of a selected crossing. A crossing is selected by rotating the Crossing Selector knob to the desired crossing. This adjusts the CTCSS encoder to the CTCSS tone assigned to that crossing. The operator must take care in selecting the appropriate crossing.

The Green Light and Red Light push buttons generate different DTMF signaling tones, which control the shore-side units to change to the selected light colour.

The embedded radio is set to operate on a fixed simplex channel (464.6625MHz) and requires an external antenna (not supplied). The Ferry-side controller is housed in a heavy duty glass reinforced polyester enclosure and requires a +12V DC supply to operate.

1.2.3 Shore-side Operation

Each crossing will be have two Shore-side controllers installed (one at each end presumably). The Shore-side controller consists of a NEMA-4 enclosure containing an embedded radio, CTCSS Decoder, Power Supply & DTMF Decoder.

The Shore-side controllers are configured for fixed CTCSS tone. There are two Shore-side controllers per CTCSS tone (please refer to Figure 3). The controllers will only respond to signals with matching CTCSS tones. This segregates one crossing from another. After seeing a matching CTCSS tone, the DTMF signal, which is sent from the Ferry-Side controller, is decoded. The appropriate relay output is triggered depending on which DTMF string is sent.

The embedded radio is set to operate on a fixed simplex channel (464.6625MHz) and requires an external antenna (not supplied). The Shore-side enclosure is housed in a heavy duty metal enclosure and requires a 120V AC to operate.

1.2.4 Potential Drawbacks

There could be an issue if the operator selects the improper crossing and then transmits a light change signal. He may not have visual confirmation of the incorrectly changed crossing.

2. CONFIGURATION

The following is the CTCSS Assignment chart:

Shore-side Name	CTCSS Frequency	TS64 Jumper Position
Gondola Point	67.0Hz	All Out
Kennebecasis	71.9Hz	JP6
Gagetown	196.6Hz	JP5
Westfield	36.6Hz	JP4
Hampstead	91.5Hz	JP3
Belleisle	79.7Hz	JP2
Evandale	74.4Hz	JP1

2.1. TS-64 CTCSS Decoder Board (Shore Side)

The TS-64 is solder bridge configured per crossing for the desired CTCSS tone. These boards have been configured for Receive Audio Mute Output to be pulled to ground by solder bridging JP7. This ensures that only a signal which is meant for a specific crossing is received.

Please reference the included TS-64 User Manual for information regarding the configuration of the TS-64.

2.2. TS-64 CTCSS Decoder Board (Ferry Side)

The TS-64 is wired to the 7 Position Crossing Selector. Selecting a crossing using the selector sets the desired CTCSS tone.

Please reference the included TS-64 User Manual for information regarding the configuration of the TS-64.

2.3. NC-409 DTMF Encoder (Ferry Side)

The NC-409 is configured to send a DTMF signal of 148 when the Green button on the front panel of the Ferry Side controller is pressed. It is configured to send a DTMF signal of 1489 when the Red button on the front panel of the Ferry side controller is pressed. The NC-409 is also set to send digits at a rate of 10 digits per second.

Please reference the included NC-409 User Manual for information regarding the configuration of the NC409.

2.4. NC-400 DTMF Decoder (Shore Side)

The NC400 DTMF Decoder is configured to close the primary relay when it receives a DTMF signal of 148 and it will open the primary relay upon reception of a DTMF signal of 1489.

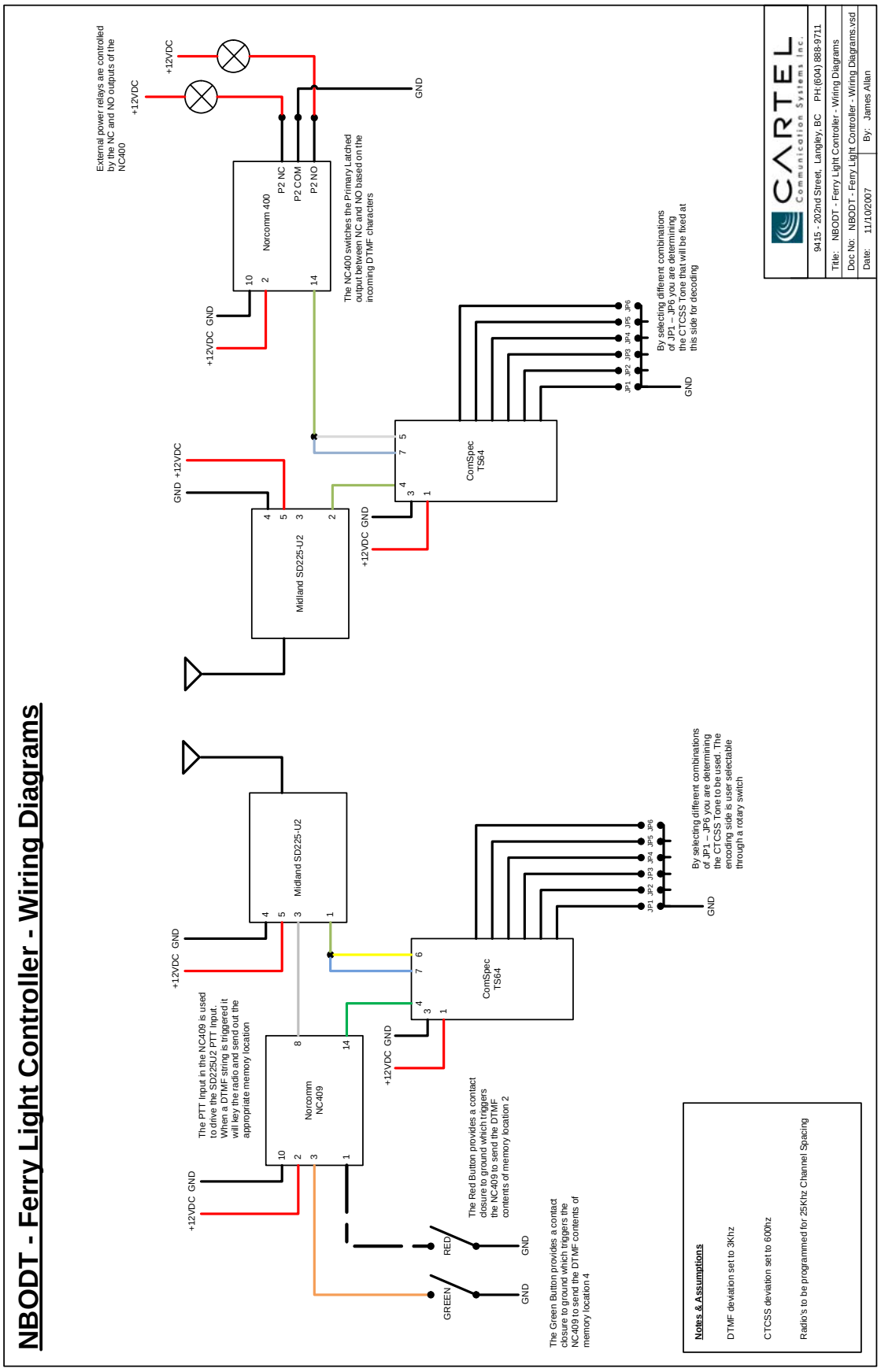
Please reference the included NC400 User Manual for information regarding the configuration of the NC400

2.5. Midland SD225U2 UHF Radio (Shore and Ferry Side)

The Midland SD225U2 UHF Radio is programmed to transmit on a simplex channel of 464.6625 (25kHz wide). All programming of the radio is done using the supplied software and interface cable.

Please reference the included SD225U2 User Manual for information regarding the configuration of the SD225U2.

3. WIRING DIAGRAMS



4. LAY-OUT

4.1. Ferry-side Controller

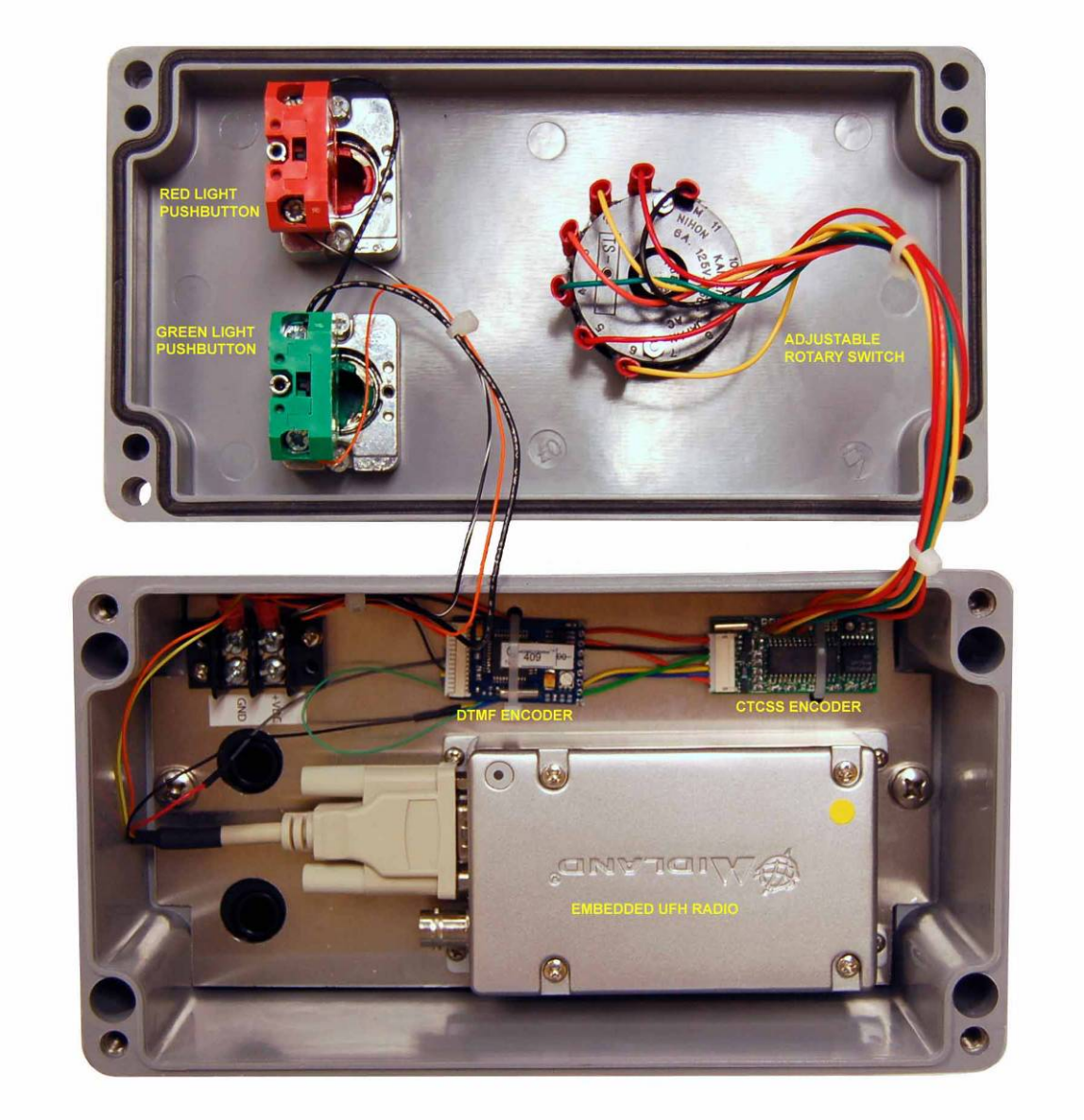


Figure 2: Internal Lay-out of Ferry-side Controller

4.2. Shore-side Controller

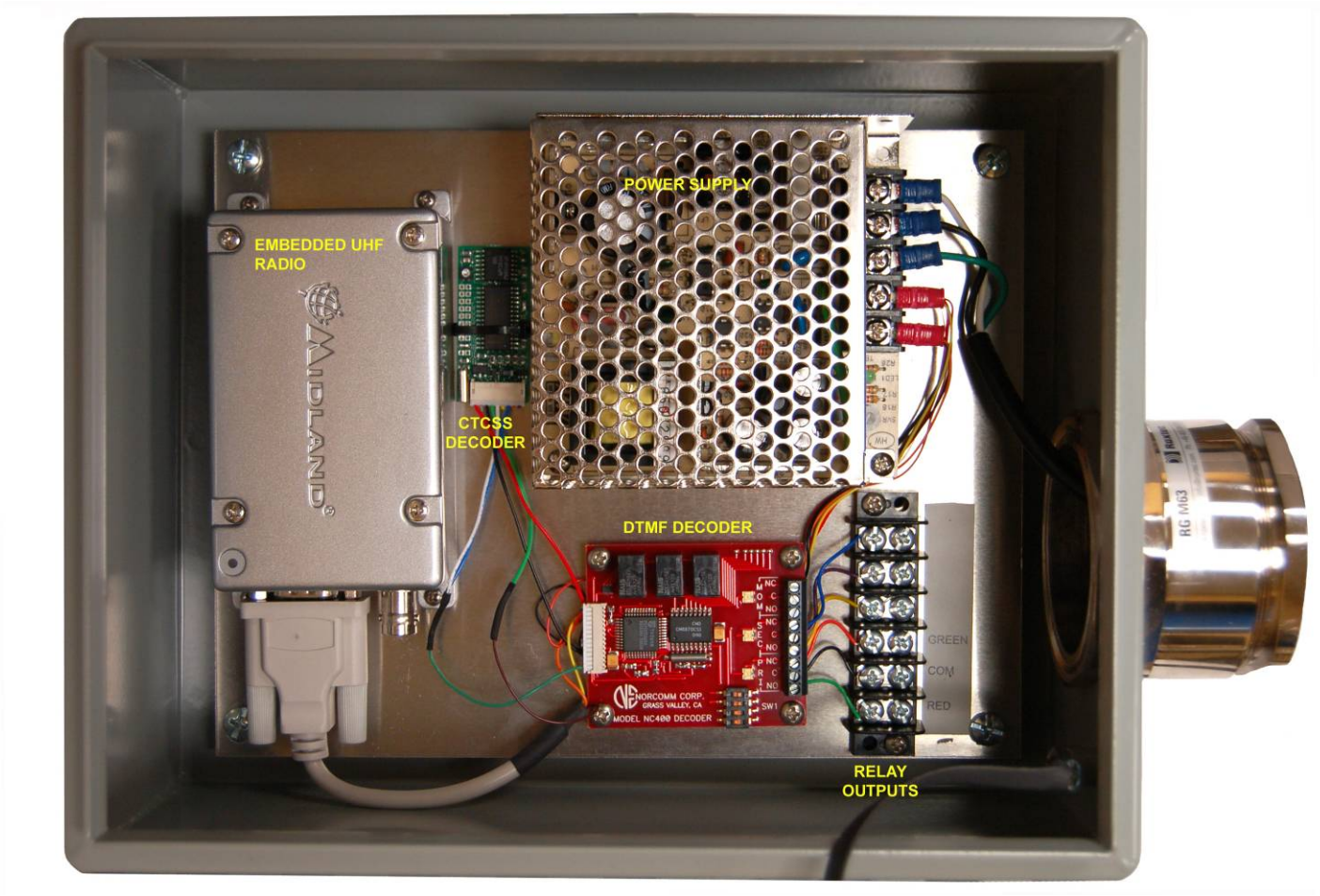


Figure 3: Internal Lay-out of Shore-side Controller