Frequency Hopping Spread Spectrum Transmitter

Transmitter Certification

FCC ID: JEH7730GA2

ACS Report Number: 04-0209-15C

Manufacturer: NCR Corporation
Models: 7730-2011, 7730-2012, 7730-2014 and 7730-2015

Manual

NCR RealPrice

Release 3.4

Hardware Service Guide

Preface

This guide describes installation and service procedures for the NCR *RealPrice™* System hardware. NCR RealPrice is the new brand name for the previously named NCR DecisioNet System.

Safety Warnings

Servicing

Caution: This product does not contain user serviceable parts. Servicing should only be performed by a qualified service technician.

Lithium Battery Warning

Caution: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type as recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Attention: Il y a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type recommandé par le constructeur. Mettre au rébut les batteries usagées conformément aux instructions du fabricant.

Battery Disposal (Switzerland)

Refer to Annex 4.10 of SR814.013 for battery disposal.

IT Power System

This product is suitable for connection to an IT power system with a phase-to-phase voltage not exceeding 240 V.

Peripheral Usage

This product should only be used with peripheral devices that are certified by the appropriate safety agency for the country of installation (UL, CSA, TUV, VDE) or those which are recommended by NCR Corporation.

Environmental Consciousness

NCR is demonstrating its concern for the environment by designing an intelligent power management system into this terminal that operates efficiently whether the system is in a stand-alone or network environment.

Grounding Instructions

In the event of a malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This product is equipped with an electric cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into a matching outlet that is properly installed and grounded in accordance with all local codes and ordinances. Do not modify the plug provided – if it will not fit the outlet, have the proper outlet installed by a qualified electrician. Improper connection of the equipment-grounding conductor can result in a risk of electric shock.

The conductor with insulation having an outer surface that is green with or without yellow stripes is the equipment-grounding conductor.

If repair or replacement of the electric cord or plug is necessary, do not connect the equipment-grounding conductor to a live terminal. Check with a qualified electrician or service personnel if the grounding instructions are not completely understood, or if you are in doubt as to whether the product is properly grounded.

Use only 3-wire extension cords that have 3-prong grounding plugs and 3-pole receptacles that accept the product's plug. **Repair or replace damaged or worn cords immediately.**

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Chapter 3: **Maintenance**

Appendix A: **Parts Order Information**

<u>Glossary</u>

Revision Record

Issue	Date	Remarks
A	Apr. 2003	First issue
B	July 2003	Updated to include Firmware Bootloader for upgrading firmware
C	Nov 2003	Added Power Supply Installation Requirements
		Changed the process in *Updating CBS's Firmware Image – Firmware Bootloader* section
D	July 2004	Updated *Updating CBS's Firmware Image – Firmware Bootloader* section
E	Sept 2004	Updated for 3.4 Hardware Release

Radio Frequency Interference Statements

Federal Communications Commission (FCC)

Information to User

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause interference in which case the user will be required to correct the interference at his own expense.

NCR is not responsible for any radio or television interference caused by unauthorized modification of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by NCR. The correction of interference caused by such unauthorized modification, substitution or attachment will be the responsibility of the user. The user is cautioned that changes or modifications not expressly approved by NCR may void the user's authority to operate the equipment.

RF Exposure (Intentional Radiators Only)
In accordance with FCC requirements of human exposure to radiofrequency fields, the radiating element shall be installed such that a minimum separation distance of (20cm) is maintained between the radiating element and the general population.

Canadian Department of Communications

This Class A digital apparatus complies with Canadian ICES-003.

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le règlement sur le brouillage radioélectriques édicté par le ministrère des Communications du Canada.

Voluntary Control Council For Interference (VCCI)

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

International Radio Frequency Interference Statement

Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Declaration of Conformity

Manufacturer's Name	NCR Corporation
Manufacturer's Address	NCR Corporation Retail Solutions Division – Atlanta 2651 Satellite Boulevard Duluth, GA 30096-5810
Type of Equipment	Information Technology Equipment
Model Number	Class 7730-2xxx
Electrical Ratings (Input)	100-120 V/200-240 V, 2.0 A/1.0 A, 50-60 Hz

NCR Corporation, 1700 South Patterson Boulevard, Dayton, OH 45459, USA, declares that the equipment specified above conforms to the referenced EU Directives and Harmonized Standards.

EU Directive	Harmonized Standard(s)
89/336/EEC (EMC) 1999/5/EC (R&TTE)	EN 301 489-1 V1.2.1: 2000-08 EN 301 489-17 V1.1.1: 2000-09 EN 300 328-1 V1.2.2: 2000-07 I-ETS 300-440, EN 55022, CISPR 16-1 EN 61000-3-2, EN 61000-3-3, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-11
73/23/EEC (Low Voltage)	EN60950:1992 A1 - A4, A11

NCR Corporation
Retail Solutions Division — Atlanta
2651 Satellite Boulevard
Duluth, GA 30096-5810

European Contact:
International IP Counsel
206 Marylebone Road
London, NW1 6LY, England

Chapter 1: Introduction

About This Guide

This guide, for RealPrice System installers and technicians, describes how to install and service the following RealPrice System components:

- Communication Base Station(s) (CBSs)

- CBS Power Supply(s)

- Transmit and receive antennas

Release 3.1 and Release 3.2 Information

This guide contains details about servicing RealPrice hardware in the following RealPrice System environments:

- RealPrice for AIX Release 3.1

- RealPrice for Windows NT/Windows 2000/Windows XP Release 3.2

Where applicable, operating environment-specific information is provided.

Chapter Summaries

The following is a brief description of each chapter in this guide:

- *Chapter 1: Introduction* - This chapter provides a brief description of each chapter in this guide and lists additional RealPrice System documents that are available.

- *Chapter 2: Installing the Hardware Infrastructure* - This chapter describes how to prepare and install CBSs, power supplies, antennas and cabling.

- *Chapter 3: Maintenance* - This chapter describes RealPrice hardware maintenance and replacement procedures and Firmware update procedures.

- *Appendix A: Parts Order Information* - This appendix provides information on model codes, available kits and part order numbers.

Information Sources

For additional information about the RealPrice System, refer to the following documents:

Title	Document ID	Description
RealPrice Site Preparation Guide	B005-0000-1501	This guide provides site preparation information for RealPrice RF infrastructure components.
RealPrice Software Guide	B005-0000-1479	This guide describes how to install, configure, and service the RealPrice System software in the Windows environments.
RealPrice Utilities Guide	B005-0000-1487	This guide describes how to use the RealPrice System utilities to setup RF infrastructure configuration parameters and how to diagnose and analyze RealPrice System hardware and software problems.
RealPrice Store Operations Guide	B005-0000-1497	This guide describes how to use the software's features and functions using the RealPrice Release 3.2 Console graphical user interface.
RealPrice AIX CUI User's Guide	B005-0000-1473	This guide describes how to use the software's features and functions using the RealPrice for AIX Release 3.1 character-based user interface (CUI).
RealPrice AIX HHT User's Guide	B005-0000-1456	This guide describes how to use the software's features and functions using the RealPrice for AIX Release 3.1 character-based user interface (CUI) on a hand held terminal.
RealPrice Implementation	B005-0000-1250	This CD provides project management and planning information for site

Title	Document ID	Description
Guide		installations.

The following document is for NCR internal use only and is available at http://merlin.corp.ncr.com/

Title	Document ID	Description
RealPrice Certification Site Survey Policy	497-0421218	This policy describes how to certify and document a completed installation's site configuration for support purposes.

RealPrice System Installation Reference

The planning and installation of a RealPrice System is a coordinated effort between various NCR organizations, third-party hardware and software vendors, and the customer over an extended period of time. The following chart lists the primary areas of installation activity and identifies where details may be found to support the personnel performing the activity.

For Windows Installations

Activity	Task	Reference
Site Planning	Site Surveys	Implementation Guide
Install RF Infrastructure	Run power, communication, and antenna cables	Hardware Service Guide Chapter 2
	Install Power Supplies, mount CBS units and CBS antennas	
Configure CBS IP Addresses	Setup static IP Addresses using RealPrice Support Utility (dnutils)	Software Guide Chapter 4
Verify network	Ping all CBS units	Utilities Guide Chapter 3
Document CBS Network Addressing	Record CBS Numbers, MAC Addresses, and IP Addresses	Software Guide Chapter 4

Activity	Task	Reference
Install RealPrice Software	Load the RealPrice Base Application	Software Guide Chapter 2
Configure RealPrice Software for CBS units	Modify CBS Configuration file (dncbsconfig.xml) using RealPrice Support Utility (dnutils)	Software Guide Chapter 4
Configure CBS Units	Set store-specific CBS parameters using RealPrice Support Utility (dnutils) Timeslots Hopping Table	Software Guide Chapter 4
Confirm CBS Functionality	Verify CBS Diagnostic Log and Tally information using RealPrice Support Utility (dnutils)	Utilities Guide Chapter 2
Perform Power Supply Configuration Test	Verify that the correct number of CBS units are connected to each Power Supply Three (3) CBS units are connected to each 24V Power Supply. Five (5) CBS units are connected to each 48V Power Supply.	Utilities Guide Chapter 4
Perform Healthcheck on all CBS receive antennas	Use Coverage Test utility (dncalib) to display RSSI (Received Signal Strength Indicator) data	Utilities Guide Chapter 4
Certify the Site	Use the RF Certification Utility to confirm RF infrastructure functionality and coverage	Implementation Guide and RF Certification Utility Guide

Activity	Task	Reference
	area	
Perform Initial Load	Initialize RealPrice Database and Electronic Shelf Labels	Implementation Guide and Initial Load Process Guide
Confirm Integration Software	Run Data Reader Test in the RealPrice Support Utility (dnutils) after all software is installed	Utilities Guide Chapter 2

For AIX Installations

Activity	Task	Reference
Site Planning	Site Surveys	Implementation Guide
Install RF Infrastructure	Run power, communication, and antenna cables	Hardware Service Guide Chapter 2
	Install Power Supplies, mount CBS units and CBS antennas	
Configure CBS IP Addresses	Setup static IP Addresses	Installation and Service Guide Chapter 4
Verify network	Ping all CBS units	Installation and Service Guide Chapter 3 and 7
Document CBS Network Addressing	Record CBS Numbers, MAC Addresses, and IP Addresses	Installation and Service Guide Chapter 3
Install RealPrice Software	Load the RealPrice Base Application	Installation and Service Guide Chapter 5
Configure RealPrice	Modify CBS Configuration file (dncbsconfig.xml) using CBS	Installation and Service Guide

Activity	Task	Reference
Software for CBS units	Setup Utility (dncbssetup)	Chapter 7
Configure CBS Units	Set store-specific CBS parameters using CBS Setup Utility (dncbssetup) Timeslots Hopping Table	Installation and Service Guide Chapter 7
Confirm CBS Functionality	Verify CBS Diagnostic Log and Tally information using CBS Setup Utility (dncbssetup)	Installation and Service Guide Chapter 7
Perform Power Supply Configuration Test	Verify that no more that three (3) CBS units are connected to each Power Supply	Installation and Service Guide Chapter 7
Perform Healthcheck on all CBS receive antennas	Use Coverage Test utility (dncalib) to display RSSI (Received Signal Strength Indicator) data	Installation and Service Guide Chapter 7
Certify the Site	Use the RF Certification Utility to confirm RF infrastructure functionality and coverage area	Implementation Guide and RF Certification Utility Guide
Perform Initial Load	Initialize RealPrice Database and Electronic Shelf Labels	Implementation Guide and Initial Load Process for AIX Guide
Confirm Integration Software	Run RealPrice Data Reader Test (dndatareader.exe) after all software is installed	Installation and Service Guide Chapter 7

Chapter 2: Installing the Hardware Infrastructure

Chapter Overview

This chapter describes how to install the RealPrice hardware infrastructure. This includes the following components:

- CBSs

Note: The RealPrice Release 3.4 Communication Base Station (CBS) is a 10/100Base-T Ethernet device and may be used in a 10 Base-T or 100Base-T Ethernet network. CBS power supplies

- Data and power cables
- Transmit and receive antennas

For information about ordering these parts, refer to Appendix A.

Note: After the RealPrice hardware is installed, the RealPrice software must be configured and the site must be RF certified. Refer to the following documents:

- "Chapter 4: CBS Configuration" in the *RealPrice Software Guide* (B005-0000-1479)
- *RealPrice RF Certification Utility Guide* (AIP-000269) or the "Certify RF Infrastructure" section of the *RealPrice Implementation Guide* (B005-0000-1250).

Policy for New Installations

It is the CBS installer's responsibility to ensure that CBS firmware revision levels are correct at the time of installation.

The correct firmware level is one of the following:

1. The latest firmware version available at www.ncr.com -> Support -> Drivers and Patches -> Retail Support Files -> Retail RealPrice Support Files.

2. A customer-specified firmware version. A small number of customers do not allow installation of any new firmware that has not been integration tested in their lab. The installation project planner (usually NCR Professional Services) informs if this is the case.

Due to supply chain logistics, new CBSs may not come pre-installed with the latest firmware. Always verify.

To keep up to date, subscribe to the RealPrice software/firmware update mailing list. NCR uses this list to announce new firmware releases. Subscribe by sending an email to majordomo@lists.ncr.com with "subscribe realpriceupdates" in the body of the message.

Installation Recommendations

*   The most efficient way to install the RealPrice hardware infrastructure is in one pass through the store. Install the CBSs, antennas, power cables, and data cables all at the same time.

*   Whenever possible the CBSs should installed at 15 feet or lower so that serviceability by the ladder is possible.

*   The primary CBS must be installed so that it is serviceable from the floor.

*   Label all CBSs, antennas, and data cables. Document how components are labeled for future reference.

*   Label all power supplies and 48V cables for serviceability.

- Power supply labels should indicate which CBSs they power, and the fact that they are part of the RealPrice ESL system.

- The 48V cable labels should indicate which CBS they lead to.

- Neatness makes servicing the system much easier.

- Do not mount the power supply AC main power strips on the floor or in a place where they might be accidentally switched off.

- Do not mount power supplies on the floor or in a place where wires might get accidentally pulled out.

- Provide slack in cables, especially in receive antenna cables.

- Test the system as it is being installed. Refer to "Chapter 3, CBS Network Utilities and Diagnostic Tools" in the *NCR Utilities Guide* (B005-0000-1487) for information on testing.

- Provide AC power that meets NCR requirements for the power supplies. Refer to the "Power, Grounding and Distribution Requirements" section of the *RealPrice Site Preparation Guide* (B005-0000-1501).

- Test wiring as it is installed. Some installation problems are extremely difficult to diagnose later.

- RealPrice Release 3.x requires the RF infrastructure to be connected to the site's RealPrice Software Controller to test the infrastructure. Refer to the following for information on testing the infrastructure and site certification:

- RealPrice Implementation Guide (B005-0000-1250)

- RealPrice RF Certification Utility Guide (AIP-000269)

- *RealPrice III Certification Site Survey Policy* (497-0421218)

General Layout Instructions

- The cable length between any two devices (10/100Base-T compatible Ethernet hub to CBS or CBS to CBS) cannot exceed 100 m (328 ft.).

- The maximum number of Ethernet levels beyond the primary CBS is three (3).

- The maximum total cable length is as follows:

Cable	Maximum Cable Length
Ethernet (primary CBS to last CBS in chain)	300 m (984 ft.)
Power supply to last CBS in the chain	162 m (532 ft.)

- Use only NCR authorized communication cable.

- Communication cables must be secure and locked into their connectors.

- The maximum number of CBSs per store is 85.

- If the communication cable is routed through an exposed area, such as up the side of a wall, across the top of a freezer where merchandised is stacked, or in an elevator shaft, it must be in a conduit and the conduit must be connected to the building ground.

- The minimum distance between a communication cable and a fluorescent, neon, or incandescent light is 30 cm (12 in.).

- Minimum distance between a transmit or receive antenna and a neon light is 2.43 m (8 ft.).

- All communication cable connections must be protected from electrical and mechanical deterioration. The deterioration of communication cable connections due to corrosion or electrolysis, especially in a humid or corrosive atmosphere, may result in electrical noise.

- Minimum distance between the transmit antenna and any receive antenna connected to 1 Watt or 500 mW CBS's is 9.2 m (30 ft.). Minimum distance between the transmit antenna and any receive antenna on a 100 mW CBS is 6.2 m (20 ft.). There is no minimum distance between two transmit antennas.

- The minimum distances between a communication cable and electrical equipment/associated power cables are as follows:

Maximum Rated Circuit Power	Unshielded Power Cables	Shielded Power Cables
1 kVA	30.5 cm (14 in.)	2.54 cm (1 in.)
2 kVA	45.7 cm (18 in.)	5.08 cm (2 in.)
5 kVA	60.9 cm (24 in.)	15.24 cm (6 in.)
Over 5 kVA	152.4 cm (60 in.)	30.48 cm (12 in.)

- All interconnecting wiring between the Ethernet hub, CBSs, and power supplies is low voltage wiring. This wiring must conform to all local and national electrical codes for the routing of commercial signal wire.

- Do not route communication cables outside the building.

Tools and Supplies

RealPrice infrastructure installers must have access to the tools typically found in an electrician's tool box. Additional tools and supplies an installation team may require are shown in the following table.

Tool/Supply	Quantity
Cable ties	10 per CBS
RJ45 Modular Jacks	2 per cable plus spares
RJ45 crimp kit	1
Low-torque electric screw driver	1
ESL removal tool	1 per installer
Lift truck	1
CAT5 cable tester	1

CBS Installation

The following sections describe the preparation, cabling, and installation of the CBS and its related components.

CBS Ethernet Cable Connections

The RealPrice CBS uses a star topology and has an integrated Ethernet switch that can connect to three other CBSs. RealPrice supports up to three (3) levels below the primary CBS. This topology results in the 85 CBS maximum mentioned in the "General Layout Instructions" section. The following illustration shows an example 85 CBS configuration, its Ethernet cable connections, and the maximum number of CBSs on each level.
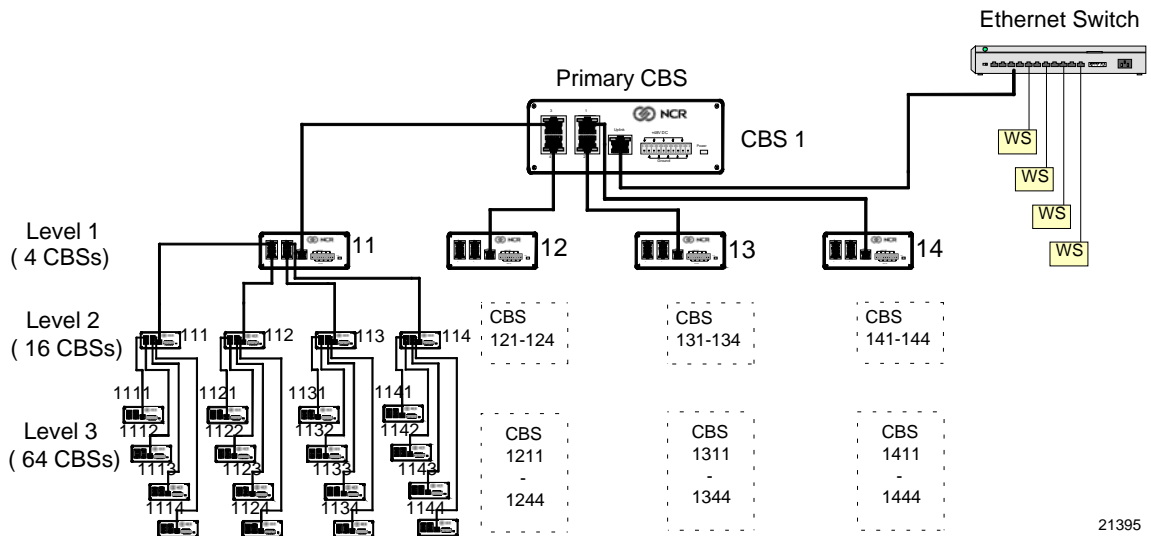
CBS Numbering

CBS's are identified in the CBS Manager section of the RealPrice CBS configuration file (DNCBSCONFIG.XML) with a unique number and a host name or IP address. Using the numbering scheme shown in the illustration helps identify the level in which the CBS is connected in the topology when running diagnostic tests and analyzing diagnostic logs. This scheme is as follows:

- Primary CBS = always 1

- Level 1 = CBS 11-14

- Level 2 = CBS 111-144

- Level 3 = CBS 1111-1444

CBS configuration details are described in "Chapter 4: CBS Configuration" in the *RealPrice Software Guide* (B005-0000-1479).

CBS Power Supply Cable Connections

The CBS Power Supply can support up to five (5) CBSs. The following illustration shows power supply cable connections for a 13 CBS configuration using 3 power supplies. This cabling scheme may be extended to support 85 CBSs.

21393
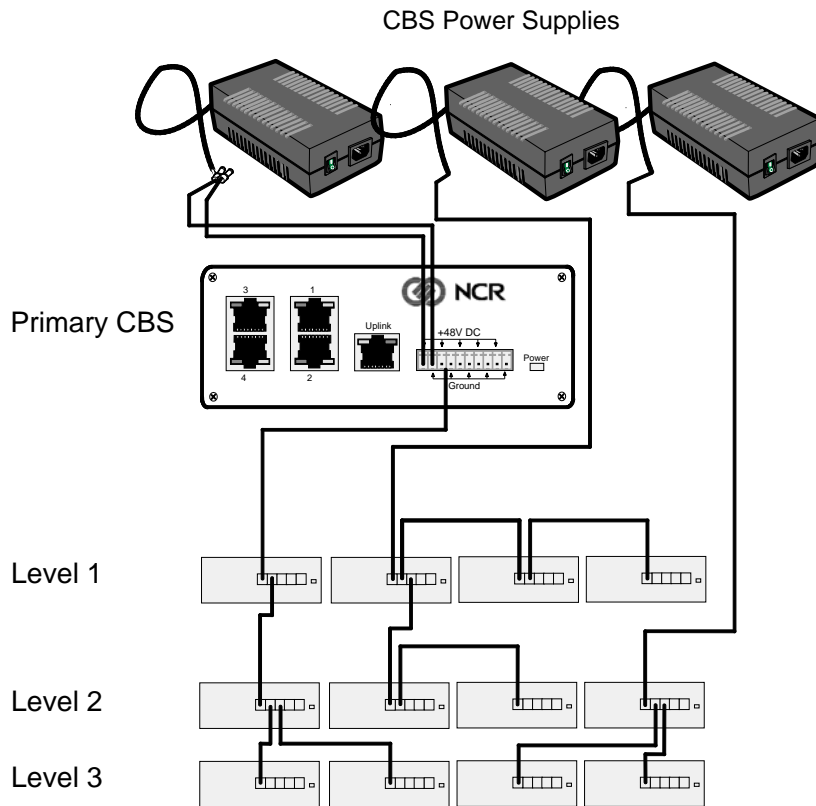
Sample Store Cabling

The following illustration shows a store layout with 12 CBSs and 3
power supply cables originate in the back office and are bundled
together, where possible, to accomplish this configuration.

21399
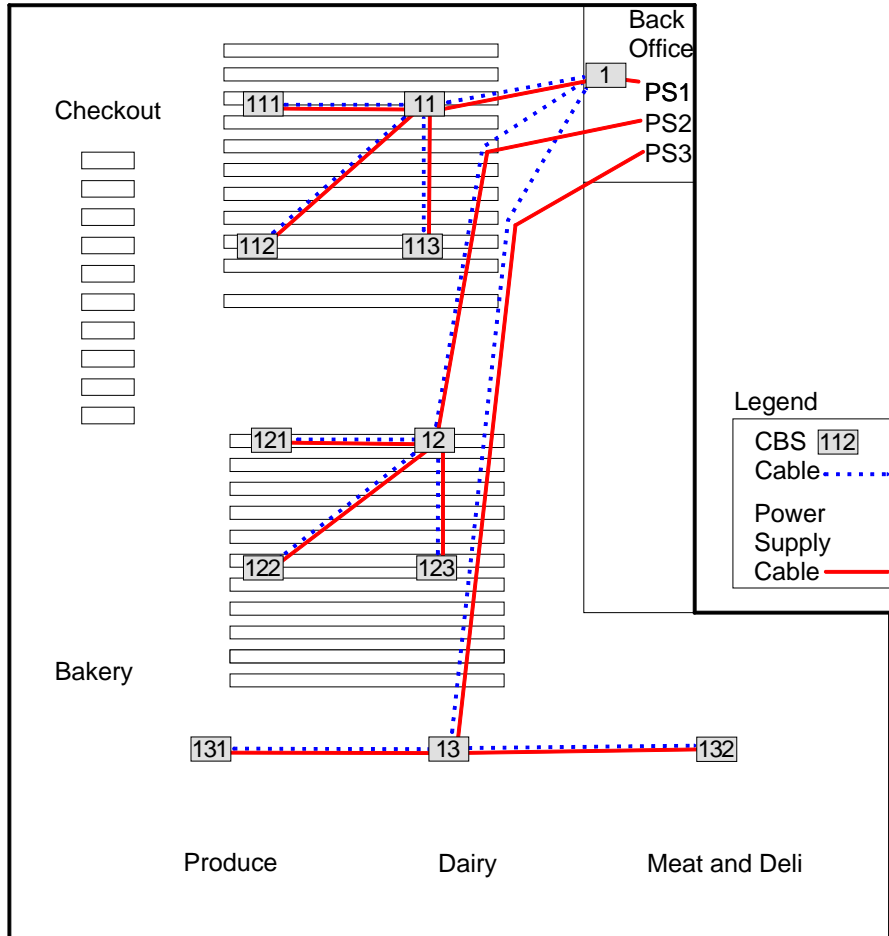
CBS Timeslots

Each CBS uses two (2) of the 24 available Timeslots to communicate with the ESLs in its coverage area. Timeslots are assigned in pairs (1, 13; 2, 14; 3, 15; and so forth) to each CBS.

To provide the most efficient communication network, adjacent CBSs *must have timeslots that differ*. The optimal difference is 6, but in larger installations, this may be difficult to accomplish.
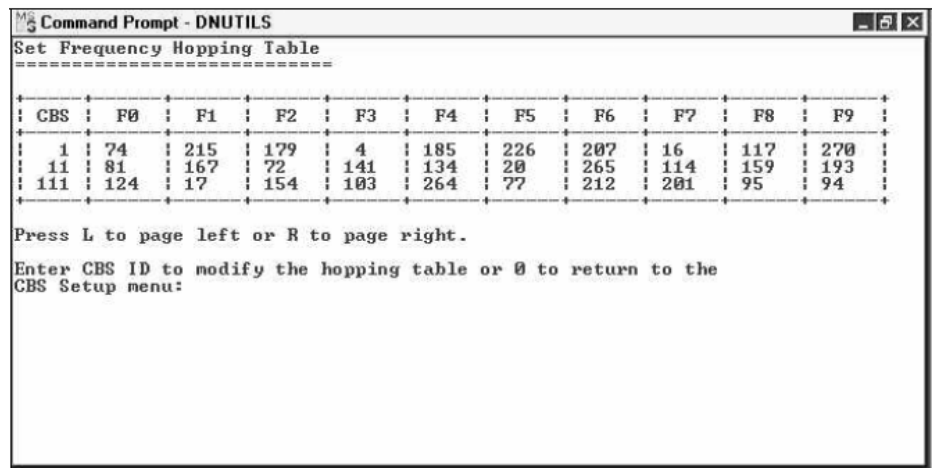
The timeslots for the CBSs shown in the Sample Store Cabling illustration in the previous section could be set as follows to achieve efficient communications:

CBS Number	CBS ID	Timeslot ID 1	Timeslot ID 2
1	1	12	24
2	11	4	16
3	21	7	19
4	22	10	22
5	23	1	13
6	12	5	17
7	24	2	14
8	25	8	20
9	26	11	23
10	13	6	18
11	27	3	15
12	28	9	21

CBS timeslot configuration can be done using the CBS Setup options in the RealPrice Support Utility (dnutils.exe) after the RealPrice Base Software is installed and the RealPrice CBS Configuration file is modified. Refer to "Chapter 2: The RealPrice Support Utility" in the *RealPrice Utilities Guide* (B005-0000-1487) for details on how to use this utility to view and set CBS timeslots for Windows installations. Refer to the "dncbssetup (CBS Setup Utility)" section of "Chapter 7: Testing and Troubleshooting in AIX" in the *RealPrice Installation and Service Guide* (B005-0000-1247) for details on how to use this utility to view and set CBS timeslots for AIX UNIX installations.

CBS Hopping Table

Each CBS is assigned a set of hopping frequencies in the 2.4 gHz range that it uses to communicate with the ESLs. There are 565 frequencies available numbered 0-564. CBS models have 83 frequencies in their hopping table associated with a Hopping Table Index (0-82) in a single frequency band. Local regulation may limit the number of frequencies permitted. For example, in France, only 142 frequencies are used.

```
M⅝ Command Prompt - DNUTILS                                          _ 🗗 ✕
Set Frequency Hopping Table
==============================

+-----+------+------+------+------+------+------+------+------+------+------+
: CBS :  F0  :  F1  :  F2  :  F3  :  F4  :  F5  :  F6  :  F7  :  F8  :  F9  :
+-----+------+------+------+------+------+------+------+------+------+------+
:   1 : 74   : 215  : 179  :   4  : 185  : 226  : 207  : 16   : 117  : 270  :
:  11 : 81   : 167  : 72   : 141  : 134  : 20   : 265  : 114  : 159  : 193  :
: 111 : 124  : 17   : 154  : 103  : 264  : 77   : 212  : 201  : 95   : 94   :
+-----+------+------+------+------+------+------+------+------+------+------+

Press L to page left or R to page right.

Enter CBS ID to modify the hopping table or 0 to return to the
CBS Setup menu:
```

To provide the most efficient communication network, CBSs must not have the same hopping table.

Hopping frequencies are assigned during the manufacturing process, but can be modified using the RealPrice Support Utility. Refer to "Chapter 2: The RealPrice Support Utility" in the *RealPrice Utilities Guide* (B005-0000-1487) for details on how to use this utility to view and set the CBS Hopping Table after the RealPrice Base Software for Windows NT/2000/XP is installed. Refer to the "dncbssetup (CBS Setup Utility)" section of "Chapter 7: Testing and Troubleshooting in AIX" in the *RealPrice Installation and Service Guide* (B005-0000-1247) for details on how to view and set the CBS Hopping Table after the RealPrice Base Software for AIX is installed.

CBS Cables

The following cables are supplied by NCR.

Cable ID (Part Number)	Description	Length m (ft.)	Connect From	Connect To	Comments
1416-C465-0018 (230-0146539)	Transmit antenna cable (plenum rated)	1.8 (5.9)	CBS transmit antenna connector	Transmit antenna	Has TNC screw-on connectors
1424-C057-0180 (230-0134951)	Receive antenna cable (plenum rated)	18 (59)	CBS receive antenna connector A, B, C, or D	Receive antenna	Has BNC connectors Cable included with receive antenna kit.
1416-C520-0150 (230-0134953)	Receive antenna cable (plenum rated)	15 (49)	CBS receive antenna connector A, B, C, or D	Receive antenna	Has BNC connectors Cable included with receive antenna kit Use this cable with 100 mW CBSs

Cable ID (Part Number)	Description	Length m (ft.)	Connect From	Connect To	Comments
7730-K055-V002 Kit (497-0436081)	Receive antenna cable (plenum rated)	12 (39)	CBS receive antenna connector	Receive antenna	Has BNC connectors
					Cable included with receive antenna kit
					Receive antenna cable is 6 meters (19 feet) long
					Use for freezer installation
Bulk cable from third-party	Power cable		CBS power supply pigtail	First of up to three CBSs	Refer to tables in next section
			CBS	CBS	
Bulk cable from third-party	Data cable		CBS	CBS	Refer to tables in next section

Note: All cables conform to type CL2P.

Power and Data Cables
The power and data cables must be purchased in bulk from a third party. NCR recommends using the Belden cables described in the following table.

Note: The wire colors referenced in the text and illustrations that follow are consistent with the recommended Belden cables. If you are using a comparable cable from another manufacturer, your wire colors may be different.

Cable Use	Manufacturer	Manufacturer Part Number	Description
Power	Belden	6100UE	2 conductor, 14 AWG (2 mm^2) stranded, unshielded, plenum rated
Power	Belden	5100UE	2 conductor, 14 AWG (2 mm^2) stranded, unshielded, non-plenum rated
Data	Belden	1585A	4 pair, CAT5, 24 AWG (0.2 mm^2) solid, unshielded, plenum rated
Data	Belden	1583A	4 pair, CAT5, 24 AWG (0.2 mm^2) `11`solid, unshielded, non-plenum rated

Note: When installing into a plenum type ceiling, plenum rated wire may be required by local or national electrical codes. Some suspended ceilings are considered plenums; open ceilings are not. Plenum rated wire is typically more costly than non-plenum. Choose the correct wire type based on your applicable local and national electrical codes. For general reference, CBS wiring falls under NEC (National Electrical Code) Class 2 type.

Power Cable Connectors

21390
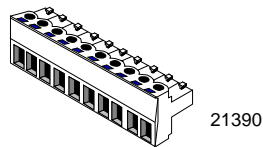
Each CBS is shipped with a 10-wire connector that plugs into the 10-wire power receptacle. The only tool required to install the power cable into the connector is a small screwdriver.

Data Cable Connectors

An RJ45 connector is required for each of the CBSs data connectors. The RJ45 connectors must be purchased from a third party. A crimp tool is required to install the data cable into the RJ45 connector.

The following table provides information about RJ45 connectors and crimp tools.

Manufacturer	Manufacturer Part Number	Quantity	Description
AMP	5-557315-1	10,000 (loose)	RJ45, 8-position, unshielded type[1]
	5-557315-2	500 (loose)	
	5-557315-3	1,000 (10 boxes of 100)	
	5-557315-4		
		1,000 (40 bags of 25)	
AMP	1-231666-1	1	Crimp tool[2]
Ideal	33-652	1	Crimp tool[2]
Ideal	30-560	1	AMP die for Ideal crimp tool[3]

[1] Use any comparable RJ45 connector compatible with your crimp tool.

[2] Use any crimp tool compatible with your RJ45 connector.

[3] Necessary only when using AMP connectors and Ideal crimp tool.

CBS Connectors and Status Lights
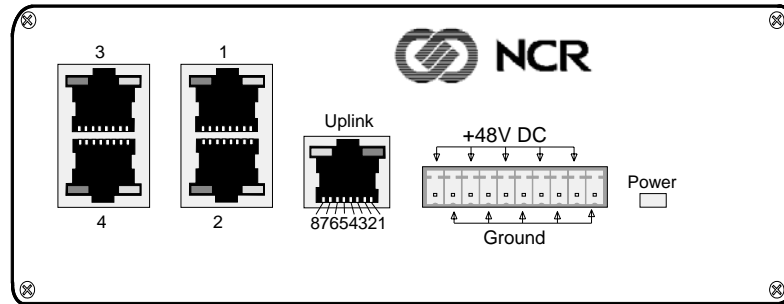
21391

Data Connectors

The CBS has four data connectors:

Uplink – used to connect to the in-store hub or a higher level CBS hub as shown in the illustration in the "CBS Ethernet Cable Connections" section of this chapter.

1, 2, 3, and 4 – used for downlink connections to lower level CBS hubs

Data connector pin and signal use is as follows:

- Pins 1, 2, 3, and 6 carry standard Ethernet transmit and receive data between the Ethernet Hub and the primary CBS and between all CBS's as defined in ISO/IEC Standard 8802.3 paragraph 14.5.1.

- Pins 4, 5, 7, and 8 are used for RealPrice transmit and receive timing signals between all CBSs.

Power Receptacle

The following table provides information about the CBS power receptacle.

Pins	Description	Connection	Belden Wire Color
1, 3, 5, 7, 9	+48 VDC	From CBS power supply to primary CBS, and CBS to CBS	White
2, 4, 6, 8, 10	Ground		Black

CBS Status Lights

The Ethernet status lights (LEDs) are in the top corners of the data connectors. The Power status light is a red LED shown to the right of the power receptacle in the previous illustration.

The CBS status lights indicate the following conditions.

LED	State	Meaning
Power (red)	On	OK (power is on)
	Off	PROBLEM (no power)
	Blinking	PROBLEM (intermittent power)
C (green) Ethernet link status	On	OK (good link)
	Off	PROBLEM (no link)
	Blinking	PROBLEM (intermittent link)
D (yellow) Ethernet activity	On	NOT DEFINED
	Off	PROBLEM (no receive activity)
	Blinking	OK (receive activity)

CBS Identification

NCR Corporation	Made in U.S.A
Class	7730
Model:	**2011-9090**
(Part of Class	7730 ESL System)
Part Number:	**497-0423350**
Date of Mfg:	**10/11/04**
Serial #:	**31-2345678**
MAC Address:	**080001357942**

48 VDC 0.4A

ONLY USE NCR MODEL 7730 48V POWER SUPPLY

Patents:5 640 683, 5 604 923
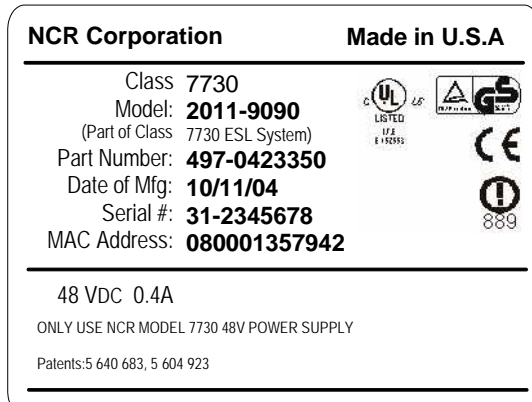
21954

The CBS product label identifies the model number, serial number, and unique MAC address of the CBS. The least significant 6 hexadecimal characters of the MAC address are used to specify the host name for each CBS in the CBS Manager section of the RealPrice CBS Configuration file (DNCBSCONFIG.XML). The host name format is NCRDNETXXXXXX where XXXXXX represents the 6 characters from the MAC address (357942 for the sample label above).

When you complete the RF infrastructure installation, you need to assign IP addresses and verify CBS communications. The recommended method for managing IP addresses is through the use of Static IP Addressing. A DHCP Manager from a DHCP Server may also be used. Refer to "Chapter 4: CBS Configuration" in the *RealPrice Software Guide* (B005-0000-1479) for details about assigning CBS addresses in your Ethernet network and also how to enter the CBS configuration information in the CBS Configuration File. Refer to the "Verify Communication Links" section for how to verify CBS communications.

CBS Installation

Install the CBSs at the same time you install the power cables, data cables, and antennas. The most efficient way to install the RealPrice hardware is in one pass through the store.

The following table and illustration show a CBS and the mounting hardware shipped with the CBS.
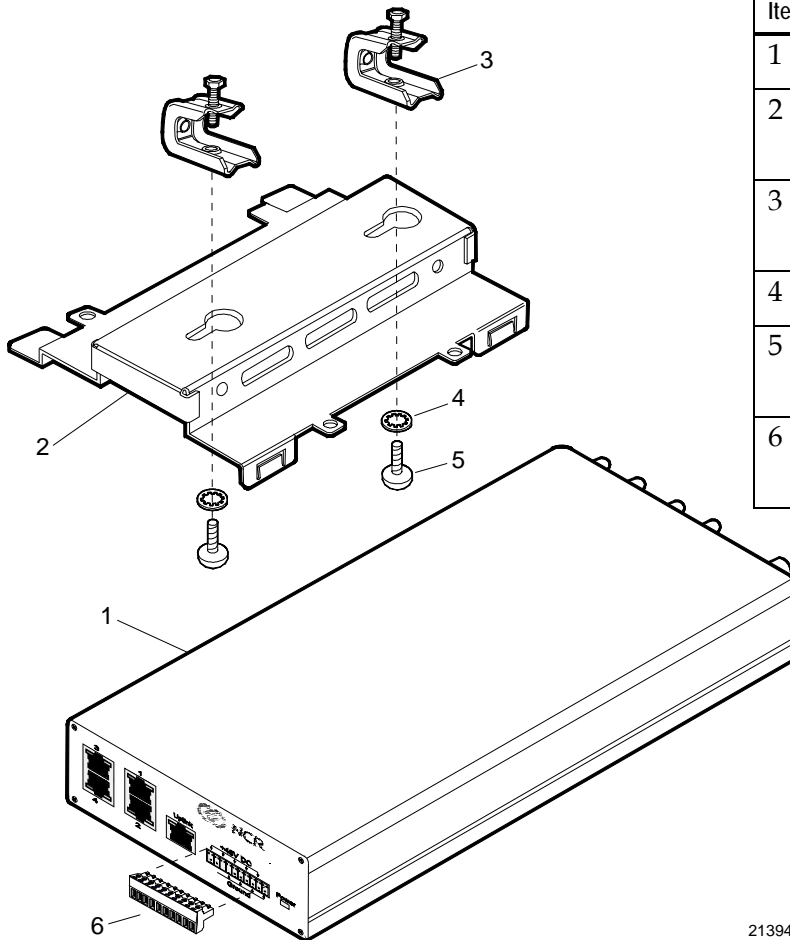
Item	Quantity	Description
1	1	CBS
2	1	CBS mounting bracket
3	2	Universal beam clamp
4	2	Lock washer
5	2	Screw (¼ -20 x ¼ Phillips head)
6	1	Power connector (installed on CBS)

21394

The CBS can be mounted in any position. The mounting bracket and universal beam clamps permit a wide variety of installations. Position the CBS for easy LED and connector access. The following illustrations show a CBS mounted to a roof truss.

Step 1. Step 2.
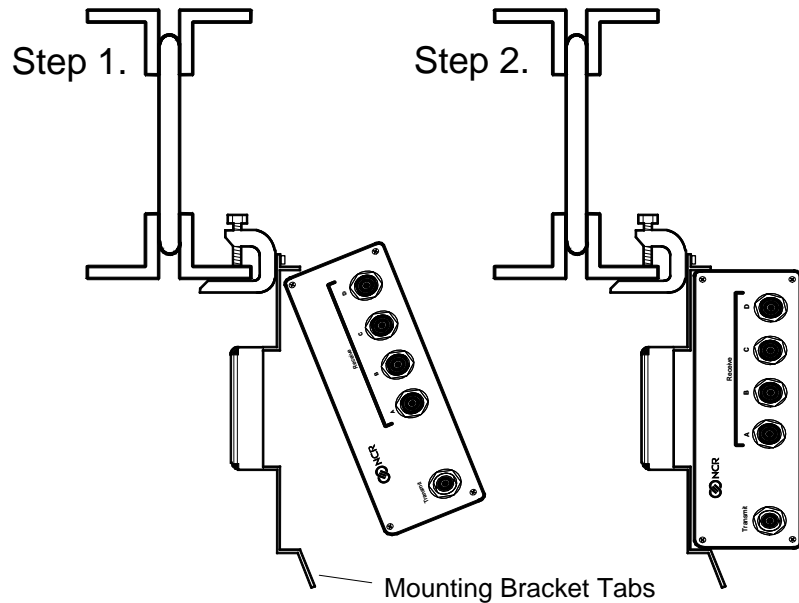
Mounting Bracket Tabs   21392

Warning: The CBS must be mounted securely and installed in accordance with local building codes. The mounting surface must be able to withstand a minimum weight of 2.26 kg (5 lb.).

Caution: DO NOT install a CBS by placing it on a ceiling tile.

The following procedure describes the installation of a CBS to a roof truss as shown in the previous illustration.

1. Attach the CBS mounting bracket to the universal beam clamp using the Phillips head screws and the tabs on the side of the CBS mounting bracket.

Caution: Vibrations can loosen the screws holding the mounting bracket to the clamps. It is extremely important to place the lock washers on the screws before installing the screws into the clamps.

2. Attach the clamp to the beam.

3. Insert the CBS as shown in Step 1 and Step 2 of the illustration. Make sure CBS is latched by the mounting bracket tabs.

Note: Press the mounting bracket tabs to remove a CBS from the mounting bracket.

Alternate CBS Mounting Solution

21397
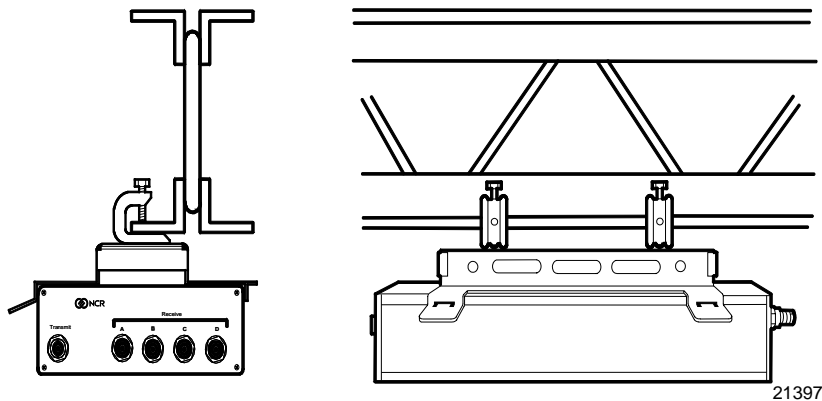
Connecting Ethernet Data Cables

From the primary CBS, a data cable connects every secondary CBS in the system as shown previously in "CBS Ethernet Cable Connections" section. Note that the Uplink data connector is used to connect to a higher level CBS and the data connectors 1, 2, 3, and 4 are used to connect to lower level CBSs. Otherwise, use standard CAT5 Ethernet wiring conventions.

General Comments Regarding Ethernet Wiring

In this section, the assumption is that RJ45 connectors are being crimped directly to the ends of each cable. It is acceptable to use punch-down jacks and pre-fabricated CAT5 patch cables, or any other generally accepted CAT5 wiring methodology.

Connecting the Ethernet Hub to the Primary CBS

Each store configuration has only one primary CBS. All other CBSs are secondary CBSs. The primary CBS is connected directly to the Ethernet Hub. Standard 4 pair, CAT5, 24 AWG solid, unshielded cables are required for all Ethernet communications.

Locate the Ethernet hub.

1. Cut a length of data cable that is long enough to reach from the hub to the primary CBS. Refer to "General Layout Instructions" section for maximum cable length information.

2. On each end of the data cable, install the wires into an RJ45 connector as shown in the following illustration and then crimp the connector onto the cable.
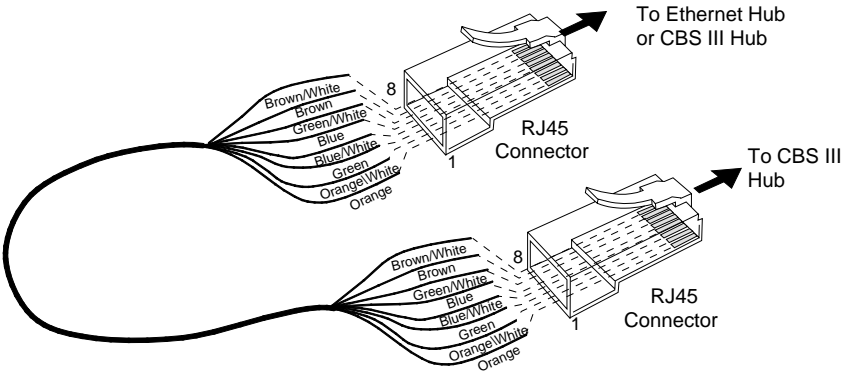
Note: Colors shown are for recommended Belden cables. Your wire colors may be different.

18959

Belden Wire Colors

RJ45 Pin	Color	RJ45 Pin	Color
1	Orange	5	Blue
2	Orange/White	6	Green/White
3	Green	7	Brown
4	Blue/White	8	Brown/White

3. Plug the data cable into the Uplink data connector on the primary CBS.

Connecting Secondary CBSs

Follow these steps to connect the secondary CBSs:

1. Cut a length of data cable that is long enough to reach from one CBS to the next CBS.

2. On each end of the data cable, install the wires into an RJ45 connector as shown in the previous illustration and then crimp the connector onto the cable.

3. Plug the RJ45 connector into data connector 1, 2, 3, or 4 and into the Uplink data connector of the next CBS.

4. Repeat steps 1 – 3 until all secondary CBSs are linked by a data cable.

Connecting Power Supply Cables

Refer to the illustrations in the "CBS Power Supply Cable Connections" section. Power supply cable routing is store dependent. The power connector provides flexibility to connect additional CBSs in series from one CBS to another or in parallel from a CBS to four other CBSs.

Connecting CBS Power Supplies to AC Power

Place the CBS power supplies with the host computer system, if possible. Plug all power supplies into a common power strip so that they can be powered on and off at the same time for reset purposes. AC main power strips must have an indicator light to prevent confusion about whether the system is currently powered on or off. **DO NOT** remove power by unplugging the +48 VDC plug from the power supply or the CBS as this may cause damage to the CBS.

Cable length restrictions may prevent installing all power supplies in the same location. In this case, it may be necessary to install a separately switched AC main circuit so that the power supplies can still be controlled at the same time. If local electrical codes or special circumstances require the installation of more than one switched AC main circuit for the power supplies, all the main circuit switches should be in the same easily accessible location.

Do not install the CBS power supply in the ceiling.

1. Have an electrician install new AC receptacles if needed.

2. Do not plug the CBS power supply into an AC receptacle until steps 1 – 6 in the next section are complete and the transmit antenna is connected to the CBS.

Connecting CBS Power Supplies to CBSs

Each CBS power supply can power up to five CBSs as shown previously in the store configuration illustration. The wiring is the same for each group of up to five CBSs.

Follow these steps to connect a CBS power supply to each group of up to three CBSs:

1. Cut a length of power cable that is long enough to reach from the power supply to a CBS.

2. Splice the power cable wires to the pigtail supplied with the power supply (black to black and red to white) and then crimp the provided crimp connectors over the splices.

White

Black

White

White

Black

Black

White

Black

Note: Colors shown are for recommended Belden
cables. Your wire colors may be different.
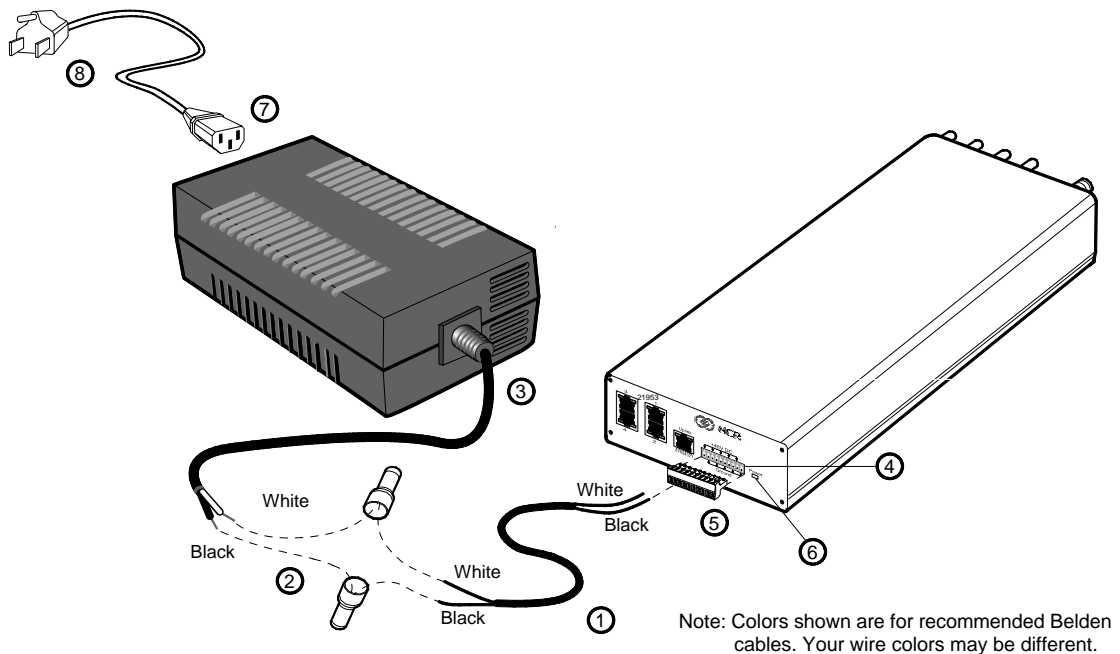
21398

3. Plug the connector into the power supply.

4. On the CBS, unplug the power connector.

5. Install the power cable wires into the connector (white into pin 1, 3, 5, 7 or 9 [48 V] and black into pin 2, 4, 6, 8 or 10 [Ground]). Use pins in pairs: 1-2, 3-4, 5-6, 7-8, and 9-10 for each power cable connection at the CBS.

6. Plug the connector back into the CBS.

7. Insert the AC power cable into the power supply's AC receptacle.

8. Connect the AC plug to the AC power source.

9. Turn on AC power by setting switch to ON position. (Green light indicates that power source is working properly).

Caution: To prevent damage to the transmitter, the transmit antenna must be connected to the CBS before applying power to the CBS.

CBS Antennas

Two types of antennas are available:

- Transmit

- Receive

The transmit and receive antennas look similar, but have the following differences:

- The transmit antenna has a small blue dot on the antenna case.

- The transmit antenna has a 1.83 m (6 ft.) cable attached. The cable has a threaded reverse polarity TNC connector that attaches to the CBS.

- The receive antenna has a 0.25 m (10 in.) cable attached. The cable has a female BNC connector. A CBS Receive Antenna cable (1424-C057-0180) is used between the attached cable and the CBS. This cable has two BNC connectors.

14086
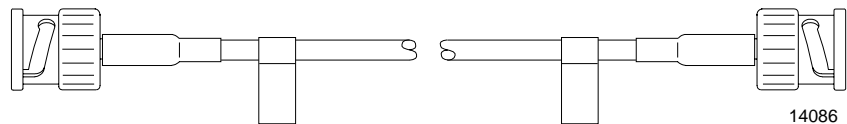
Note: The new Antenna cable for Freezers is 6 meters (19 feet) long.

Note: With 100 mW CBSs, a 15 m (49 ft.) receive antenna cable 1416-C520-0150 must be used instead of the usual 18 m (59 ft.) receive antenna cable.

Consider the following when installing antennas:

- Install the antennas at the same time that the CBSs are installed.

- When connecting cables to antennas (especially Transmit antennas), make sure connections on both ends are properly aligned on the threads and are screwed down completely.

- Use care when connecting cables so the antenna cable connector is not loosened from the circuit board inside the antenna.

- On a suspended ceiling, mount the antennas to the ceiling tile. In an open ceiling, hang the antennas from the roof trusses.

- When mounting the antenna, face the front of the antenna (the side opposite the cable connector) towards the ESLs, with as few obstructions between it and the ESLs as possible.

Caution: The transmit antenna is required to comply with FCC RF exposure requirements for mobile transmitting devices. A separation of 20 cm (8 inches) or more must be maintained between the antenna and all persons during device operation to satisfy RF exposure compliance.

Installing CBS Antennas

The transmit antenna and receive antenna kits include the same mounting hardware. The installation procedures for the transmit and receive antennas are the same.

Note: Observe the following precautions to avoid RX antenna ESD failures:

1. Always connect the RX cable to the CBS *before* connecting the cable to an RX antenna.

2. Keep antennas in their anti-static packing bags until they are ready to be installed.

3. Before handling, installing, or removing an RX antenna, touch a grounded metal surface.

4. Only trust antennas that arrive in silver-gray plastic bags with anti-static warning stickers.

5. If using a lift truck, ensure that it has an anti-static ground drag strap. If it does not, then drag a short length of metal chain from the lift truck undercarriage to dissipate any static energy.

Mounting an Antenna to a Suspended Ceiling
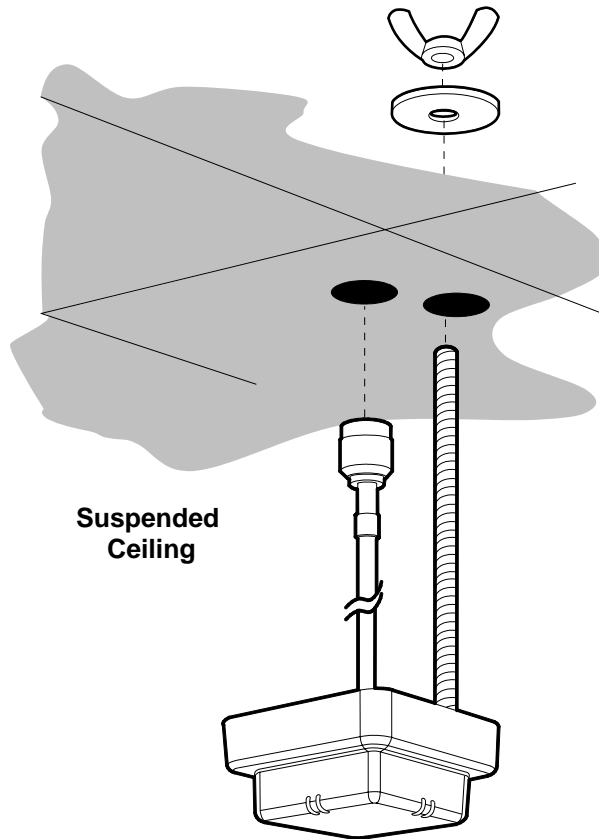
20354

Note: Maintain a minimum distance of 9.2 m (30 ft.) between a 1 W or 500 mW CBS's transmit and receive antennas. Minimum distance for a 100 mW CBS's transmit and receive antennas is 6.1 m (20 ft.).

To install an antenna on a suspended ceiling:

1. At the desired location, make two (2) 16 mm (5/8 in.) holes in the ceiling tile using the template provided with the antenna kit.

Note: Make sure debris from the ceiling tile does not fall into the antenna connector.

2. Screw the 63.5 mm (2.5 in.) antenna stud into the 1/4-20 UNC hole in the back of the antenna.

3. Route the antenna cable through one hole in the ceiling tile and the antenna stud through the other hole.

4. Place the 31.75 mm (1.25 in.) fender washer on the antenna stud and screw the 6.35 mm (0.25 in.) wing nut onto antenna stud until it firmly holds the antenna against the ceiling tile.

5. Connect the antenna cable as follows:

   • Transmit antenna - Attach the 1.83 m (6 ft.) Transmit antenna cable to the CBS.

   • Receive antenna - Connect one end of the Receive antenna cable to the CBS. Attach the Receive antenna pigtail to the other end of the Receive antenna cable.

6. Use cable ties to secure the antenna cable.

Mounting an Antenna in a Freezer

Freezer Gasket

Freezer Bracket
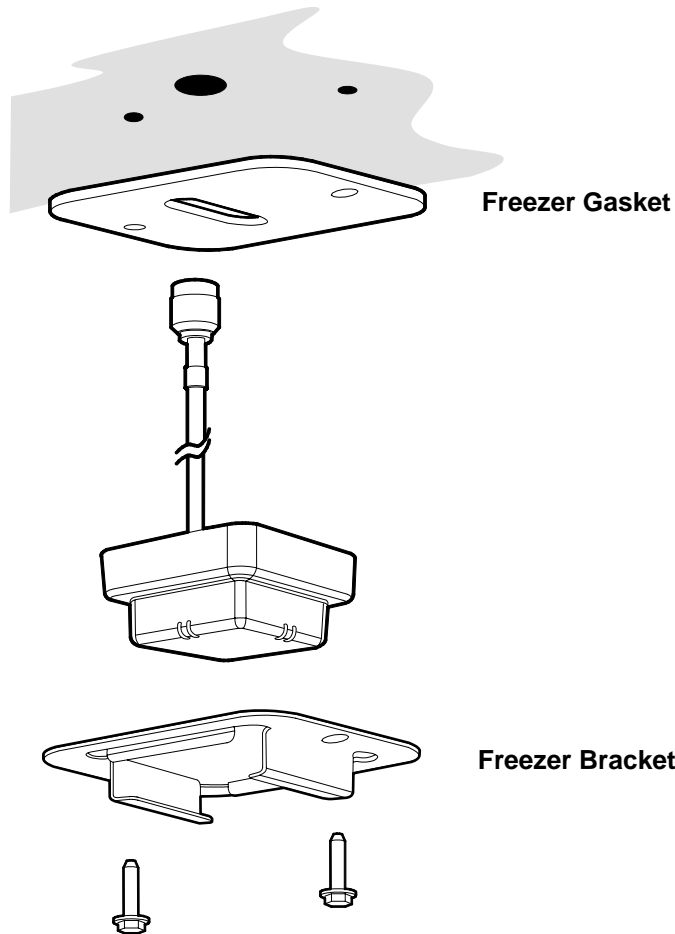
20355

7730 RealPrice CBS freezer layout guidelines sometimes require mounting receive (RX) antennas inside of freezers. To prevent mechanical and moisture damage to the antenna or freezer, use the following installation guidelines:

- Seal all cable entry holes with permagum sealing compound. **Do not use expanding foam.**

- If the customer stacks merchandise on top of the freezers, protect exposed RX antenna cables with metal conduit.

- Protect the RX antenna BNC cable connector from the freezer environment.

Note: Maintain a minimum distance of 9.2 m (30 ft.) between each 1 W or 500 mW CBS's transmit and any receive antennas. Minimum distance for a 100 mW CBS's transmit and receive antennas is 6.1 m (20 ft.).

To install an antenna in a freezer:

1. At the desired location, drill one (1) 16 mm (5/8 in.) hole for the antenna cable.

2. Route the antenna cable through the hole in the Freezer Gasket.

3. Place the Freezer Bracket over the Antenna and check the alignment of the assembled parts as follows.

Note: The round and elongated mounting holes in the gasket and bracket are matched together.

- The antenna alignment guides are centered between the edges of the elongated hole in the gasket.

- The gasket does not extend past the edge of bracket on any side.

Note: Proper alignment of gasket, antenna, and bracket is necessary to make a secure seal against the ceiling.

4. Route the antenna cable through the hole in the ceiling.

5. Raise the assembled parts up against the ceiling.

6. Using the Freezer Bracket as a template, drill two (2) 3 mm (0.125 in.) holes in the freezer ceiling for the mounting screws.

7. Use the two (2) self-tapping screws to secure the bracket to the ceiling.

8. Connect the end of the Receive antenna cable to the CBS, then attach the Receive antenna pigtail to a Receive Antenna Cable. Connect the other end of the Receive antenna cable to the CBS.

Note: Protect the RX antenna BNC cable connector from the freezer environment.

- Water condensation inside and dripping water from outside an unprotected BNC connector will trigger electrolytic corrosion that will eventually destroy the connector.

- Carefully choose freezer RX antenna locations so that the inline BNC cable connectors are in a room temperature environment outside the freezer wall.

- For conventional stand-alone freezers, use the 7730-K050-V003 "Kit - Rx Antenna w/18m cable" or 7730-K054-V003 "Kit - Rx Antenna w/15m Cable (for 100mW CBS)." These antennas have a 25cm (10inch) antenna lead.

- For large walk-in and oversized freezers with high ceilings, use the new long-lead 7730-K055-V002 "Kit - Rx antenna (6m lead) and 12m cable." These antennas have an extended 6m (20ft) antenna lead for better freezer routing, but they must be used with the corresponding shortened 12m (39ft) antenna cable for proper operation.

- In special situations, it is possible to seal the inline BNC connector from the freezer environment. See the detailed instructions below.

9. Use cable ties to secure the antenna cable.

10. Seal all cable entry holes with permagum sealing compound.

- Unsealed holes will cause icicles around entry holes and frost buildup on nearby product. If the inline BNC connector is not protected, condensation will drip down the antenna cable and trigger electrolytic corrosion inside the connector that will quickly destroy it.

- To use permagum, roll a walnut-sized piece into a rope shape and push as much as possible into both ends of the cable entry hole. Permagum-type sealing compound looks like modeling clay and is commonly available from HVAC and electrical supply houses. One example is Virginia KMP brand sealing gum, catalog number PP-22V, from www.virginiakmp.com.

- If replacing an antenna or cable, re-seal the cable entry hole. New permagum is best, but existing permagum can be re-used, if necessary.

- *DO NOT* use any type of expanding foam sealant, for example Dow brand "GREAT STUFF" polyurethane foam or DAP brand DAPtex latex foam. NCR has found that these materials do not cure properly at freezer temperatures or in the presence of water condensation.

Note: If the customer stacks merchandise on top of the freezers, protect exposed RX antenna cables with metal conduit. Customers sometimes showcase large items on top of freezer units. These items will damage exposed RX antenna cables. Protect cables with short lengths of metal or plastic electrical conduit. Use appropriate straps to keep the conduit in place.

Special Instructions for Sealing Inline BNC Antenna Connectors That Must Be Located Inside Freezers

This BNC sealing procedure is only recommended for the following situations:

- If servicing a walk-in or oversized freezer that was installed before the previous guidelines were available

- If installing RealPrice infrastructure at a new site and long-lead RX antenna kit 7730-K055-V002 cannot be obtained in time to meet the installation schedule

Materials Required:

- 12in (30.5cm) length of CoaxSeal™ #105 hand-moldable plastic material (http://www.coax-seal.com). This material is available from Radio Shack and commercial electrical supply houses.

- 12in (30.5cm) length of black electrical tape, 3M Super 88 Scotch® Brand Vinyl Electrical Tape or equivalent

Procedure:

1. Connect the RX antenna to the RX cable inside the freezer.

2. Wrap the in-line connectors with electrical tape. The electrical tape allows the Coax-Seal™ material to come off cleanly in case of future servicing.

3. Wrap the connection with a 12in (30.5cm) length of Coax-Seal™ material. Wrap beyond the ends of the electrical tape in order to ensure a watertight seal.

4. Shape and form the Coax-Seal™ material to ensure a good seal.

Note: Keep the electrical tape and Coax-Seal™ material warm inside a jacket as much as possible while working in the freezer. This keeps them flexible for better adhesion.

Note: To prevent condensation from becoming trapped inside the cable connection, do not remove antennas or cables from the freezer once they have become cold. If they are removed, then keep them outside the freezer until all signs of condensation have evaporated before bringing them back in.

Hanging an Antenna from a Roof Truss

Note: Maintain a minimum distance of 9.2 m (30 ft.) between a 1 W or 500 mW CBS's transmit and receive antennas. Minimum distance for a 100 mW CBS's transmit and receive antennas is 6.1 m (20 ft.).

To hang an antenna from a roof truss (or other object) refer to the illustration on the following page and these instructions:

1. Screw the 0.61 m (2 ft.) threaded rod into the 1/4-20 UNC hole in the back of the antenna.

Note: A 2 ft. threaded rod is supplied in the antenna kit. If the open ceiling installation requires a longer section of threaded rod, it is expected the requirement be pre-determined and the longer rod be supplied by the installer.

2. Secure the antenna cable to the threaded rod using three equally spaced cable ties.

Note: Attach the 0.25 m (10 in.) Receive antenna pigtail to a Receive Antenna Cable before securing the cable to the threaded rod as shown in the illustration.

3. In the desired location, hold the antenna cable against a roof truss and lower the antenna to the desired height.

4. Use a cable tie to hang the antenna cable from the roof truss.

Caution: Antenna cables must be secured to a roof truss as shown in the following illustration. Do not hang the antenna from a CBS's connector as the connector cannot withstand the weight of the threaded rod, cable, and antenna.

5. Connect the antenna cable to the CBS.

Note: Always connect the RX cable to the CBS *before* connecting the cable to an RX antenna.

6. Use cable ties to secure the antenna cable.

Open Ceiling

20351
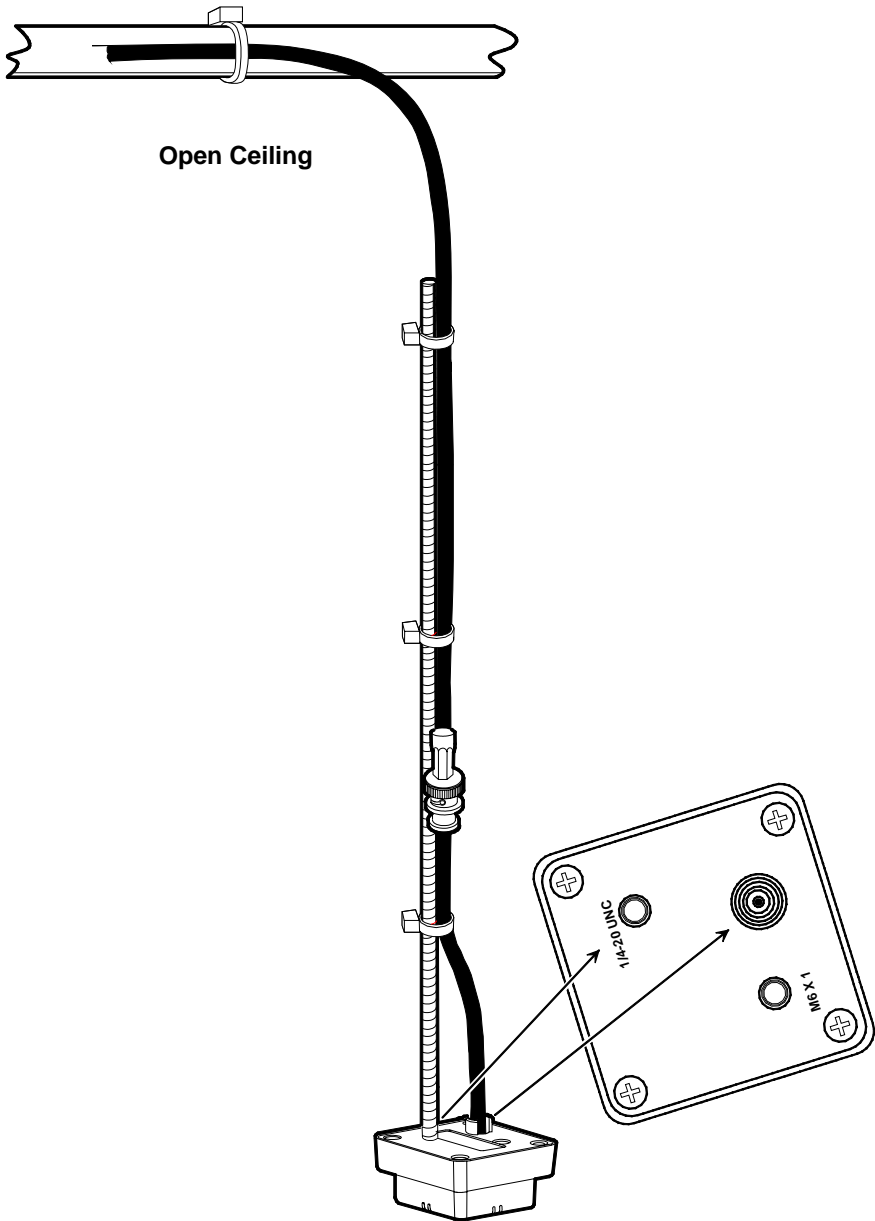
CBS Hardware Configuration

After all RF infrastructure components have been installed, and the Ethernet cabling and power supply cabling has been circuit tested for continuity, the system can be powered-up to establish the connection between an Ethernet network and the RealPrice CBS units. IP allocation can be configured using Static IP Addressing or using a DHCP Server.

Static IP addressing may be required for the following situations.

- For permanent assignment when you are not able to use the existing DHCP Server/DHCP Manager in your communication network

- For permanent assignment when you do not have a DHCP Server/DHCP Manager in your communication network and customer does not wish to have one

- For temporary assignment of IP addresses to test the RF infrastructure

The decision is made during site survey interviews between the PS Project Manager and the customer. The IP addresses, subnet mask, and gateway address are provided by the customer's IT support group.

Refer to the "Chapter 4: CBS Configuration" in the *RealPrice Software Guide* (B005-0000-1479) for details about how to configure the IP addresses for the RealPrice CBS units.

Verify Communication Links

Use the following procedures to verify your communication links.

1. Power-up each CBS.

2. Verify that each CBS link status LED is lit.

3. Use the **Ping** utility to ping each CBS using its IP Address to verify connectivity.

Note: If your network is using a Dynamic IP Addressing, use the ARP utility to display a list of the dynamically assigned IP Addresses. Refer to "Chapter 4: Common Diagnostic Utilities" in the *RealPrice Utilities Guide* (B005-0000-1487) for details on ARP. Cross reference the CBS MAC address to the CBS number assigned in the store layout to confirm all CBSs respond to the ping test. If reserved IP addresses were used, refer to that list to confirm all CBSs respond to the ping test.

Document CBS Network Addressing

Note the CBS Numbers, MAC Addresses, and CBS IP Addresses on the store layout for reference purposes.

RealPrice Software Installation, Configuration, and Testing

After the CBS hardware network is verified and you have documented the CBS network addressing information, the next steps are to install RealPrice Software, modify the RealPrice CBS Configuration file, and validate RealPrice System functionality. The following sections identify where to find details to accomplish these steps.

- Installing RealPrice Software

Refer to "Chapter 2: Installing RealPrice for Windows Software" or "Chapter 3: Installing RealPrice for AIX Software" in the *RealPrice Software Guide* for details.

- Modifying the CBS Configuration File

Refer to "Chapter 4: CBS Configuration" in the *RealPrice Software Guide* (B005-0000-1479).

- Verifying Hardware and Software Configuration

For RealPrice for Windows NT/2000/XP systems, refer to "Chapter 2: The RealPrice Support Utility" in the *RealPrice Utilities Guide* (B005-0000-1487).

- View the CBS network addresses.

- View and, if necessary, set CBS Timeslots and the Frequency Hopping Table.

For RealPrice for AIX systems, refer to "Chapter 5: Testing and Troubleshooting" in the *RealPrice Installation and Service Guide* (B005-0000-1247).

- Use the **dnutils** utility to view the CBS network addresses.

- Use the **dnutils** utility to view and, if necessary, set CBS Timeslots and the Frequency Hopping Table.

- In Windows NT/2000/XP and AIX environments use **dncalib** to display CBS ID and RSSI readings on a single ESL while standing under each CBS receive antenna to verify all CBS units are communicating properly. Refer to "Chapter 4: Common Diagnostic Utilities" in the *RealPrice Utilities Guide* (B005-0000-1487).

Note: `dncalib` must be run in Install mode for this test.

- Upgrade all CBS firmware to the latest version available. The latest firmware release can be found at **www.ncr.com -> support -> drivers and patches -> retail support files -> RealPrice support files**

Note: Check to make sure that the customer does not have a special firmware version requirement.

Caution: Some customers may not allow firmware to be installed until it has been integration tested.

- After RealPrice Base software and the custom integration software is installed, use the *Data Reader* test to check the status of the RealPrice data reader and verify ESL display data to confirm the data reader is functioning properly. Refer to the "Software Diagnostics" section in "Chapter 2: The RealPrice Support Utility" in the *RealPrice Utilities Guide* (B005-0000-1487) for details.

Chapter 3: Maintenance

Replacing RealPrice Hardware

Except for the ESL battery replacement described in this chapter, the RealPrice System hardware does not require any preventive maintenance. If there is a problem, trained NCR Customer Service personnel or other trained personnel can use the diagnostics and troubleshooting information in the *RealPrice Utilities Guide* (B005-0000-1487) to analyze and isolate the problem.

RealPrice hardware is not field-repairable. If it is determined that a CBS, antenna, power supply, or ESL is defective, use the procedures described in this chapter to replace the unit with a new one. If appropriate, contact your NCR representative for information on where to send the defective unit for repair.

Important Information: After removing or replacing the CBS or a transmit antenna, it is recommended that RF communications be re-certified. It is also recommended that the change in the site configuration be noted for support purposes. For more information, contact your NCR representative and reference the following:

- RealPrice Implementation Guide (B005-0000-1250)

- RealPrice RF Certification Utility Guide (AIP-000269)

- *RealPrice Certification Site Survey Policy* (497-0421218)

Windows 2000/NT/XP and AIX Environment Procedures

The component replacement sections in this chapter provide steps that can be followed for RealPrice installations in Windows 2000, Windows NT, Windows XP, and AIX UNIX environments. However, the procedures to stop and start the RealPrice System software are different for Windows and AIX installations. Also, the CBS Support Utility (dnutils.exe) shipped with the RealPrice Base Software for Windows NT/2000/XP and the CBS Setup utility (dncbssetup.exe) in RealPrice for AIX Release 3.1 have different procedures to access the functions available in each utility. This section identifies the environment-specific differences to use when replacing RealPrice hardware components.

Stopping and Starting RealPrice Using the Start Button

- Stop the RealPrice System software by clicking on the **Start** button and selecting **Programs > RealPrice> Stop RealPrice Applications**.

- Start the RealPrice System software by clicking on the **Start** button and selecting **Programs > RealPrice > Start RealPrice Applications.**

Stopping and Starting at a System Prompt

The following commands can be used in Windows 2000. Windows NT, and Windows XP at a DOS prompt and in AIX at the AIX UNIX prompt.

- To stop RealPrice, enter the following command:

      stopdn

- To start RealPrice, enter the following command:

      startdn

RealPrice Support Utility

Note: Refer to the Chapter 2: The RealPrice Support Utility in the *RealPrice Utilities Guide* (B005-0000-1487) for details on using this utility.

- In a Windows NT/2000/XP environment, start the RealPrice Support Utility by entering the following command at a DOS system prompt.

  ```
  dnutils
  ```

- Select the following options to *Enable Normal Mode* communications:

  11. CBS Setup > 51. Set Communications Mode > 1. Normal Mode

- Select the following options to *View/Set Timeslots*

  11. CBS Setup > 13. Timeslot IDs

- Select the following options to *View/Set Frequency Hopping Table* entries

  11. CBS Setup > 16. Hopping Tables

- Select the following options to *View Diagnostics*

  11. CBS Setup > 44. View Diagnostics

RealPrice for AIX CBS Setup Utility

Note: Refer to the "dncbssetup (CBS Setup Utility)" section in "Chapter 7: Diagnostics and Troubleshooting" of the *RealPrice Installation and Service Guide* (B005-0000-1247) for details on using this utility.

- In a Windows AIX environment, start the CBS Setup utility by entering the following command at an AIX system prompt.

```
dncbssetup
```

- *Enable Normal Mode* communications by selecting option **51. Set Communication Mode** in the *Operations* section on the main menu.

- *View/Set Timeslots* by selecting option **13. Timeslot IDs** in the S*etup* section on the main menu.

- *View/Set Frequency Hopping Table* entries by selecting option **16. Hopping Tables** in the S*etup* section on the main menu.

- *View Diagnostics* by selecting option **43. View Diagnostics** in the *Diagnostics & Tallies* section on the main menu.

Replacing a CBS

Use this procedure to replace a malfunctioning CBS with another one.

1. Obtain the CBS Timeslots for the CBS being replaced. Look in the dncbsstatus.out file for the site or get them from the Site Installation documents. This information is needed in Step 9 below to prevent coverage problems.

2. Stop the RealPrice System software.

3. Power off all CBSs in the system.

4. Disconnect antennas, power cable, and Ethernet cable(s) and remove the malfunctioning CBS.

5. Install the new CBS and reconnect the cables.

Note: If a 3.2 CBS is to be replaced with a 3.4 CBS, all of the power cables must be disconnected from the 8-pin connector and reconnected to the new 10-pin connector. The 3.4 CBS is backwards compatible.

Caution: The 3.2 CBS is not compatible with a 3.4 Power Supply. Doing so will destroy the CBS.

6. Power up all CBSs in the system.

7. Set the IP address for the new CBS.

   - If using static IP addressing – use the **Setup CBS** option in RealPrice Support Utility to assign the IP address to the CBS (MAC address)

- If using DHCP – change reservation so new MAC address is reflected

8. Start the RealPrice System software.

9. Use the RealPrice Support Utility or CBS Setup utility to set the CBS Timeslots and verify the Frequency Hopping Table does not conflict with the existing CBSs.

10. Check the Diagnostics information for the new CBS using the RealPrice Support Utility or CBS Setup utility.

    - Make changes to firmware, if mismatch – before upgrading any CBS, read firmware release notes

    - Verify Country Codes match

    - Check Transmit Power Levels

    - Not 0 (zero)

    - Within a range of +/- 10

11. Use the **dncalib** utility to verify CBS is functioning in the coverage area where the CBS was replaced.

12. Confirm that errors related to the replaced CBS are no longer being logged.

13. Run **dncbsstatus** utility to obtain new dncbsstatus.out file.

14. Upload results of all tests and files noted above to the CKS2000 web site.

Adding a CBS

Use this procedure when adding a CBS to an existing installation to extend or increase the coverage area.

1. Stop the RealPrice System software.

2. Power off all the CBSs in the system by powering off the power supplies.

3. Add Ethernet and power supply cabling to extend the existing network.

4. Install CBS Transmit and Receive Antenna(s), and antenna cables as required for the new CBS.

5. Install the new CBS and connect the cables.

6. Power up all CBSs in the system.

7. Use the RealPrice Support Utility or CBS Setup utility to make the necessary changes to the dncbsconfig.xml file to identify the new CBS IP Address or Host Name.

8. Start the RealPrice System software.

9. Use the RealPrice Support Utility or CBS Setup utility and enable *Normal Mode* communications.

10. Use the RealPrice Support Utility or CBS Setup utility to set the CBS Timeslots and CBS Hopping Table frequencies for the new CBS.

11. Check the Diagnostics information for the new CBS using the CBS Configuration utility or CBS Setup utility.

12. Use the RF Certification Utility and certify the RF coverage area of the new CBS. Refer to the *RealPrice RF Certification Utility Guide* (AIP-000269) for detail.

Replacing Antennas

Replacing a Receive Antenna

Use this procedure to replace a suspected malfunctioning receive antenna.

1. Disconnect and remove the malfunctioning receive antenna.

2. Install and re-connect the new receive antenna.

3. Use the RealPrice Support Utility or CBS Setup utility and check the Diagnostics information for the CBS where the new antenna was installed.

4. Use the **dncalib** utility to verify CBS is functioning in the coverage area where the new antenna was replaced.

5. Confirm that errors related to the replaced antenna are no longer being logged.

Replacing a Transmit Antenna

Use this procedure to replace a suspected malfunctioning transmit antenna. You MUST remove power from the CBSs during this procedure. Removing a transmit antenna from a powered CBS can damage the CBS transmitter circuitry.

1. Stop the RealPrice System.

2. Power off all the CBSs in the system by powering off the power supplies.

3. Disconnect and remove the malfunctioning transmit antenna.

4. Install the new transmit antenna.

5. Power up all CBSs in the system.

6. Start the RealPrice System software.

7. Use the RealPrice Support Utility or CBS Setup utility and check the Diagnostics information for the CBS where the new antenna was installed.

8. Use the **dncalib** utility to verify CBS is functioning in the coverage area where the new antenna was replaced.

9. Confirm that errors related to the replaced antenna are no longer being logged.

Replacing a Power Supply

Note: The power supply for release 3.4 does not work with the previous CBS hardware. Verify the correct power supply is being used.

Use this procedure to replace a suspected malfunctioning power supply.

1. Stop the RealPrice System software.

2. Power off all the CBSs in the system by powering off the power supplies.

3. Disconnect and remove the malfunctioning power supply.

4. Install a new power supply.

5. Power up all power supplies in the system.

6. Start the RealPrice System software.

7. Check the RealPrice Support Utility or CBS Setup utility Diagnostics information to confirm that all CBS's are running.

8. Confirm that errors related to the replaced power supply are no longer being logged.

Battery Replacement

Caution: Danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type as recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

When an ESL's battery becomes weak, the battery symbol in the display lights indicating that its lithium battery must be replaced. After removing the ESL from the shelf, follow these steps to replace the batteries:

1. Open the battery cover by inserting a coin in the slot and turning counter-clockwise to its detented position, exposing the three holes as shown in the following illustration.

19248
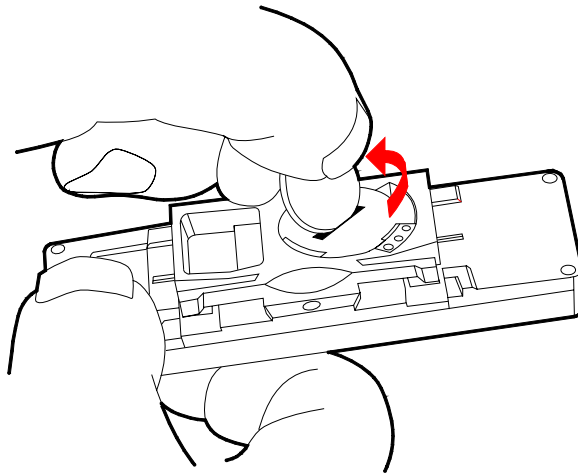
2. Attach the Battery Replacement tool to the ESL as shown in the following illustration.

A   B
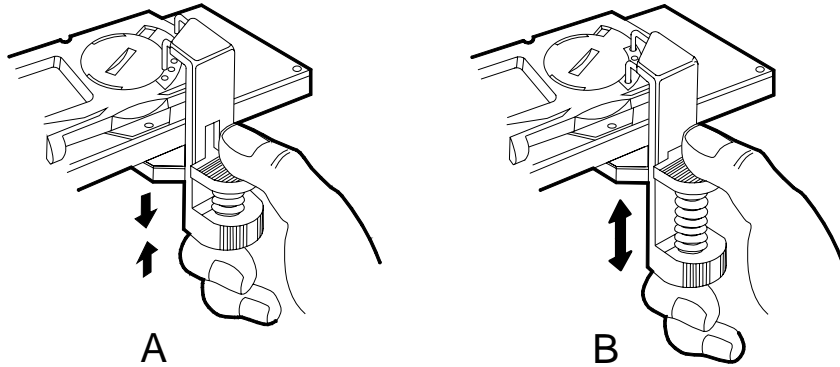
19247

3. With thumb and index finger, compress the spring to open the clamp. Set the terminals into the first and third holes.

4. Hold pressure down on the terminals into the holes and release the clamp until it firmly holds the ESL.

5. Remove the battery cover.

Caution: In the following steps, do not permit the battery to contact the terminals of the Battery Replacement tool.

6. Remove the battery.

7. Place a new battery in the battery cavity.

8. Replace the battery cover.

9. Remove the Battery Replacement tool.

Updating CBS's Firmware Image (ftpdl)

Periodically updates may be required to add enhancements or correct problems in the CBS firmware.

Upgrade all CBS firmware to the latest version available. The latest firmware release can be found at **www.ncr.com→Support →Drivers and Patches→Retail Support Files→RealPrice Support Files**.

Note: Check to make sure that the customer does not have a special firmware version requirement.

Caution: Some customers may not allow firmware to be installed until it has been integration tested.

The legacy firmware update method (ftpdl) continues to be supported for all firmware versions and is described below. To update CBS firmware using the Firmware Bootloader, see the following topic "Updating CBS's Firmware Image – Firmware Bootloader".

For updates in a Windows 2000, Windows NT, or Windows XP environment, the update file and the utility (ftpdl.exe) required to apply the update are distributed on diskette. For updates in an AIX UNIX environment, only the update file is distributed on diskette. The RealPrice CBS Firmware Update utility (ftpdl) in the /usr/local/dnet/bin directory is used to copy the update file to the CBS firmware. The update file name identifies the version, for example: rom109.bin. or rom310.bin in the following sections.

Caution: When updating CBS firmware, stop the RealPrice software on the RealPrice System computer to ensure the update process is not interrupted. If the update process is interrupted before completion, the CBS must be returned to NCR.

Windows NT/2000/XP Installations

Use the following procedure to update CBS firmware in a Windows NT, Windows 2000 or Windows XP installation.

1. Refer to the site's Installation data or use the CBS Configuration utility to obtain the IP Addresses of all the installed CBS's.

2. Insert the update diskette in Drive A.

3. Run the `ftpdl.exe` program. The following screen displays.
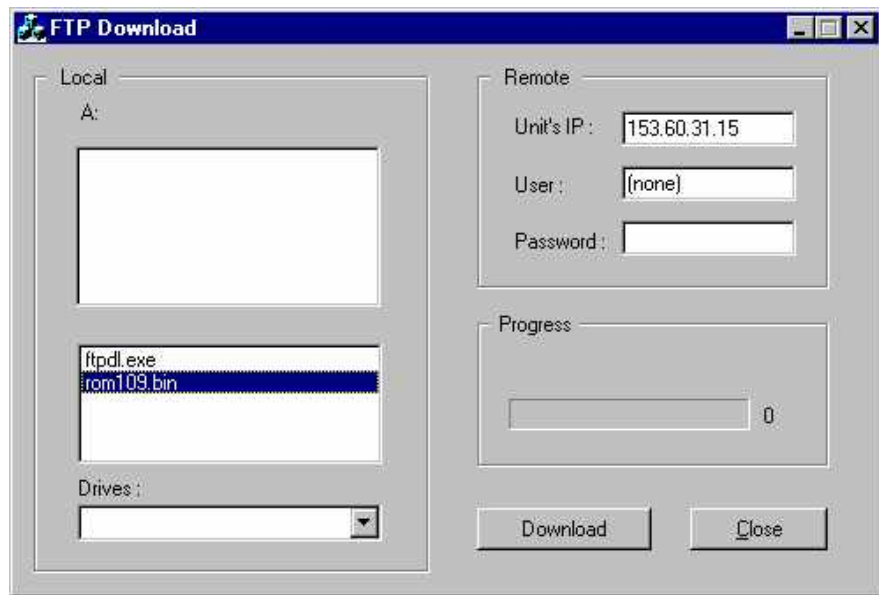
4. In the lower section of the left-hand window (*Local*) highlight the update file. In this example, `rom109.bin`.

5. In the upper right-hand window (*Remote*), enter the IP Address of the CBS in the *Unit's IP:* field.

6. Click the **Download** button.

7. The *Progress* window indicates activity during the update.

8. The following screen displays when the download is complete.

```
ftpdl                              [X]

  ⚠️     Download Completed

              [ OK ]
```

9. Click the **OK** button and proceed to the next step.

10. Repeat Steps 4 - 6 for each CBS in the network.

11. Re-start the RealPrice software. Select
    Start➔Programs➔RealPrice➔Start RealPrice Applications.

12. Use the RealPrice Support utility to verify all CBSs have new
    firmware.

AIX UNIX Installations

Use the following procedure to update CBS firmware in an AIX UNIX
installation.

1. Refer to the site's Installation data or use the CBS Configuration
    utility to obtain the IP Addresses of all the installed CBS's.

2. Insert the update diskette in Drive A.

3. Enter the following commands at the Unix prompt.

    ```
    cd /tmp
    dosread ROMxxx.BIN > ROMxxx.BIN
    ```

    where ROMxxx.BIN is the name of the update file (such as
    ROM310.bin).

4. Enter the following command at the Unix prompt.

    ```
    ftpdl ROMxxx.BIN xxx.xx.xx.xxx
    ```

    where:

    ROMxxx.BIN is the name of the update file (such as ROM310.bin)

xxx.xx.xx.xxx is the IP address of the CBS that needs the firmware update

A series of number signs (#) display to indicate update activity. The update typically takes 1 to 1 ½ minutes to finish. The following message displays to indicate a successful update.

```
CBS flashed successfully
```

Error Messages

The following messages may display to indicate an error condition.

```
Flash failed, unable to connect to
xxx.xx.xx.xxx
```

where xxx.xx.xx.xxx is the IP address typed when the command was initiated.

Confirm the IP address is correct and retry the update.

```
Flash failed, IP address is not that of a CBS
```

The IP address used is valid in the network, but the component using that address is not a RealPrice CBS unit. Confirm the IP address of the CBS requiring new firmware and retry the update.

Updating CBS's Firmware Image – Firmware Bootloader

Firmware Compatibility

Firmware 3.4.0 is compatible with all currently existing hardware versions of CBS. However, some CBS hardware/firmware combinations are not supported due to compatibility issues. Following is a summary of these restrictions:

7730 CBS Hardware Release	CBS Identification	Compatible Firmware
3.0 3.1	Serial number less than 31-36497717	All versions
"original" 3.2	Serial number greater than or equal to 31-36407717 and service part number less than 497-0435814	3.2.0 and higher
"revised" 3.2	Service part number greater than or equal to 497-0435814	3.4.0 and higher

Note: An exact serial number break-in point for the revised CBS hardware release 3.2 will be available at a future date.

Firmware Downgradability

Once a CBS is installed with firmware 3.2.0 or higher, it cannot be downgraded below firmware 3.2.0 except by returning it to the factory or by contacting NCR Level 4 support for special assistance. This is true regardless of the CBS hardware release. The ftpdl.exe utility reports an error and the CBS remains unaffected if downgrade is attempted. Note that firmware 3.2.0 does not support the TFTP bootloader feature.

Unlike the firmware 3.2.0, 3.4.0 CBS cannot be downgraded as low as the CBS hardware can allow in the previous chart. For example, the original hardware release 3.2 CBS can be downgraded from firmware 3.4.0 to 3.2.0. However, ftpdl.exe reports an error and the CBS remains unaffected if a revised hardware release 3.2 CBS is downgraded from firmware 3.4.0 to 3.2.0. If TFTP bootload feature is used to downgrade the firmware, the CBS ignores the bootload request and remains unaffected.

Updating the Firmware

Periodically updates may be required to add enhancements or correct problems in the CBS firmware.

Upgrade all CBS firmware to the latest version available. The latest firmware release can be found at **www.ncr.com**→**Support** →**Drivers and Patches**→**Retail Support Files**→**RealPrice Support Files**.

Note: Check to make sure that the customer does not have a special firmware version requirement.

Caution: Some customers may not allow firmware to be installed until it has been integration tested.

The 7730 Firmware Management System – "Firmware Bootloader" – (released with firmware version 3.3.4) facilitates firmware updates to the 7730 Communications Base Station (CBS). The Firmware Bootloader consists of software components that reside on both the RealPrice System Server and 7730 CBS units.

Upgrading firmware from 3.2.x and earlier to 3.3.4 **requires** upgrading to firmware version 3.3.4 first using the method (ftpdl) described in the previous section "Updating CBS's Firmware Image (ftpdl)".

The Firmware Bootloader supports:

- Simultaneous firmware update to multiple CBS units

- CBS recovery following application block firmware corruption

- Diagnostic features to support flash update failure troubleshooting

The Firmware Bootloader provides a simple method for updating 7730 CBS firmware. The following steps outline the method for firmware update:

- A CBS evaluates its firmware at boot time and determines if a firmware update is necessary. This determination is made by sending a TFTP request for the RealPrice boot file and comparing the internal firmware version of the CBS with the target firmware version information contained in the boot file.

- The CBS initiates the firmware update, if necessary, by making a TFTP request for the new firmware image.

- Upon completion of the file transfer, the CBS replaces its application firmware with the newly acquired firmware image.

- Finally, the boot firmware transfers control to the application firmware, and the CBS begins normal operation.

Steps for completing firmware update

1. Configure the DHCP server, if using DHCP.

   This is an optional step. DHCP server configuration is discussed at the end of this section.

2. Customize the boot file, if necessary.

   Two files are required to accomplish a firmware update:

   - an **application image**, the binary image that contains the machine instructions for normal CBS operations. Application images are non-editable binary files and are at least 700K bytes in size.

   - a **boot file** , an XML file that specifies rules and instructions for the firmware update.

Note: A default boot file and application image is distributed with each firmware release.

Boot File

Boot files are small, editable XML-formatted files of 1K bytes or less and contain the following information:

- Update instructions indexed by CBS' current firmware revision

- Application image filenames

- Application image revision information

Boot files may contain wildcard information to select a group of target CBS units with similar characteristics. Boot files may stipulate a firmware upgrade to a newer revision or a downgrade to an older revision.

The user may wish to modify the boot file to specify a different location for the firmware image or specify new rules for the update. The boot file may be modified with any basic text editor. A sample boot file is shown:

```
<?xml version="1.0"?>
   <?xml-stylesheet type="text/xsl"
   href="dnbootloadconfig.xsl"?>
   <!DOCTYPE rp7730 SYSTEM "dnbootloadconfig.dtd">

   <rp7730>
   <ImageFilename>rom334.bin</ImageFilename>
   <ImageVersion>3.3.4</ImageVersion>
   <TargetVersion>3.*.*</TargetVersion>
   </rp7730>
```

- ImageFilename is the file name of the firmware image to be used to upgrade the CBSs firmware level.

- ImageVersion is the new firmware revision level.
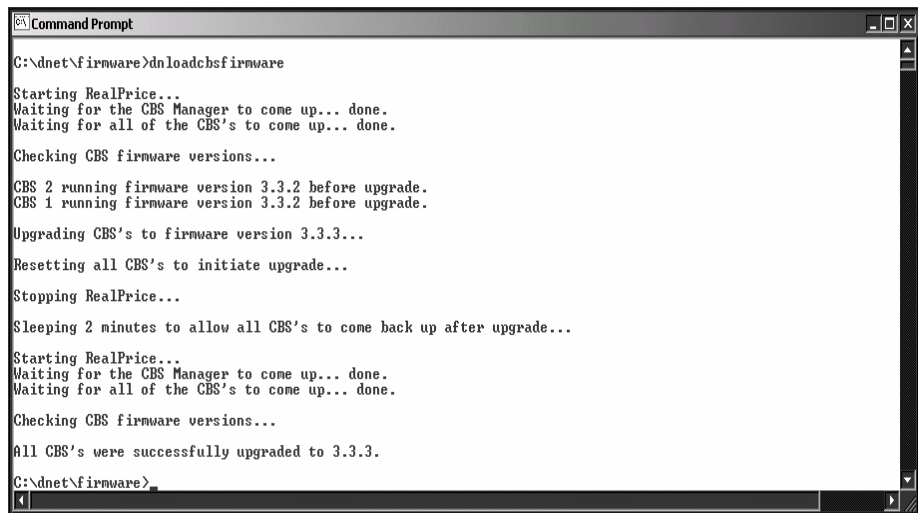
Note: ImageFilename and ImageVersion versions must match for successful firmware upgrade as shown in the following example:

```
...
<ImageFilename>rom334.bin</ImageFilename>
<ImageVersion>3.3.4</ImageVersion>
...
```

The ImageFilename indicates that the firmware image is 3.3.4 and ImageVersion reflects the same version.

TargetVersion is the firmware version that is targeted to be upgraded. Wild card characters can be used.

3. Place the boot file and firmware image in the dnet\firmware directory.

4. From a command prompt, type `dnloadcbsfirmware`. The following screen displays if successful.

```
Command Prompt                                                    _ □ X

C:\dnet\firmware>dnloadcbsfirmware

Starting RealPrice...
Waiting for the CBS Manager to come up... done.
Waiting for all of the CBS's to come up... done.

Checking CBS firmware versions...

CBS 2 running firmware version 3.3.2 before upgrade.
CBS 1 running firmware version 3.3.2 before upgrade.

Upgrading CBS's to firmware version 3.3.3...

Resetting all CBS's to initiate upgrade...

Stopping RealPrice...

Sleeping 2 minutes to allow all CBS's to come back up after upgrade...

Starting RealPrice...
Waiting for the CBS Manager to come up... done.
Waiting for all of the CBS's to come up... done.

Checking CBS firmware versions...

All CBS's were successfully upgraded to 3.3.3.

C:\dnet\firmware>
```

Note: `dnloadcbsfirmware` takes care of the stopping and starting RealPrice as well as flashing firmware. The process will take a few minutes. Please be patient while the entire process is carried out.

5. If the firmware upgrade was unsuccessful, the following screen displays.

The table below shows the possible errors while upgrading the CBS.

Error Code	Description
0	Success
1	an unrecognized failure occurred
3	No DHCP server responded to boot request
4	The TFTP server address is unknown
5	the TFTP server did not reply to request
7	the TFTP server could not find the requested boot file
8	critical information is missing from the boot file
9	the TFTP server could not find the requested image file
10	the new image file and boot file information

		do not match
	11	the new image file sumcheck is bad
	12	the new image is incompatible with the hardware
	13	an error occurred while writing to flash memory

Note: dnloadcbsfirmware attempts to upgrade the CBSs three times. If CBSs report failure to upgrade after all attempts, power cycle the target CBS units. The user may manually power cycle the CBSs or initiate a soft reboot.

Manual Power Cycle

To manually power cycle the units, unplug the CBS Power Supplies from the AC source. Reconnect each power supply starting with the power supply connected to the primary CBS. Continue reconnecting each power supply.

Soft Reboot

To initiate a soft reboot, from a command prompt, type dnCBSreset. It takes a few minutes to reset the CBSs and complete the firmware update.

6. Optionally, examine the target CBS units to confirm that the firmware update was successful.

Use the utilities dnCBSFirmware and dnCBSDiags to confirm the success of the firmware update.

dnCBSFirmware

From a command line prompt, type dnCBSFirwmare to display the ARM version (firmware version level) for each CBS in the RealPrice system.
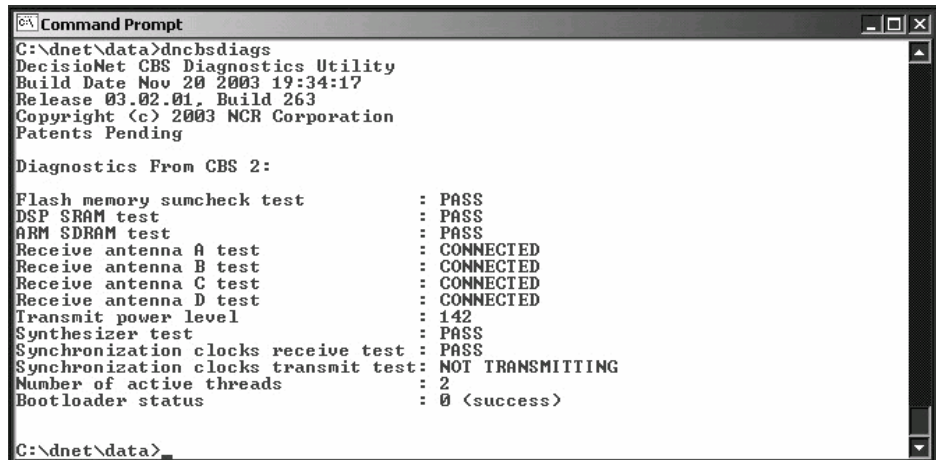
If the firmware update has been successful, the DOS window displays all of the CBSs with the correct firmware level listed.

If the result of dnCBSFirmware shows different versions among the CBSs or no change to the firmware version, run dnCBSDiags to determine the error.

dnCBSDiags

From a command line prompt, type dnCBSDiags to view the diagnostics for each CBS.

Review the Bootloader Status entry which reports the status of the Bootloader update process. **0 (success)** indicates that the process has been successful.

```
Command Prompt                                                      _ □ ×
C:\dnet\data>dncbsdiags
DecisioNet CBS Diagnostics Utility
Build Date Nov 20 2003 19:34:17
Release 03.02.01, Build 263
Copyright (c) 2003 NCR Corporation
Patents Pending

Diagnostics From CBS 2:

Flash memory sumcheck test           : PASS
DSP SRAM test                        : PASS
ARM SDRAM test                       : PASS
Receive antenna A test               : CONNECTED
Receive antenna B test               : CONNECTED
Receive antenna C test               : CONNECTED
Receive antenna D test               : CONNECTED
Transmit power level                 : 142
Synthesizer test                     : PASS
Synchronization clocks receive test  : PASS
Synchronization clocks transmit test : NOT TRANSMITTING
Number of active threads             : 2
Bootloader status                    : 0 (success)

C:\dnet\data>_
```

7. Troubleshoot problems with the firmware update.

   Verify that the TFTP Server is installed and configured properly. See section "NCR TFTP Configuration" later in this chapter.

   Verify that the DHCP Server is configured properly.

   Verify that the boot file is correctly formatted and defines the

   correct file to use for the upgrade.

Note: The process may need to be repeated to successfully update the firmware.

DHCP Server Configuration

DHCP is optional and depends on how the RealPrice system is configured in a store environment.

If the TFTP server is running on a different server than the RealPrice server or if a different TFTP server is used, DHCP needs to be configured.

To configure the Windows NT 4 Server DHCP server to work with the NCR TFTP server, vendor specific information needs to be configured.
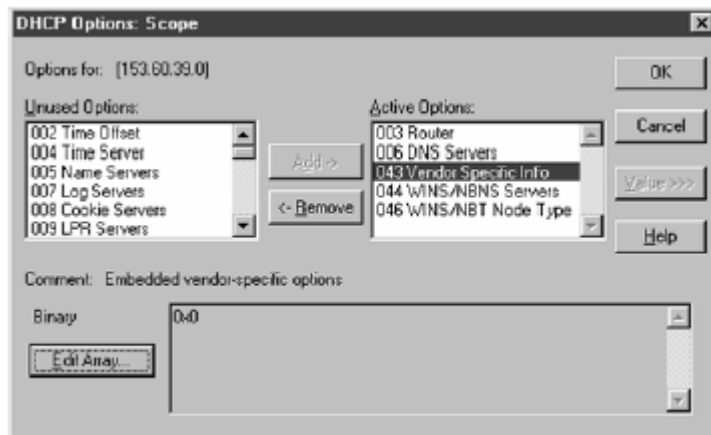
1. Open the DHCP Manager.
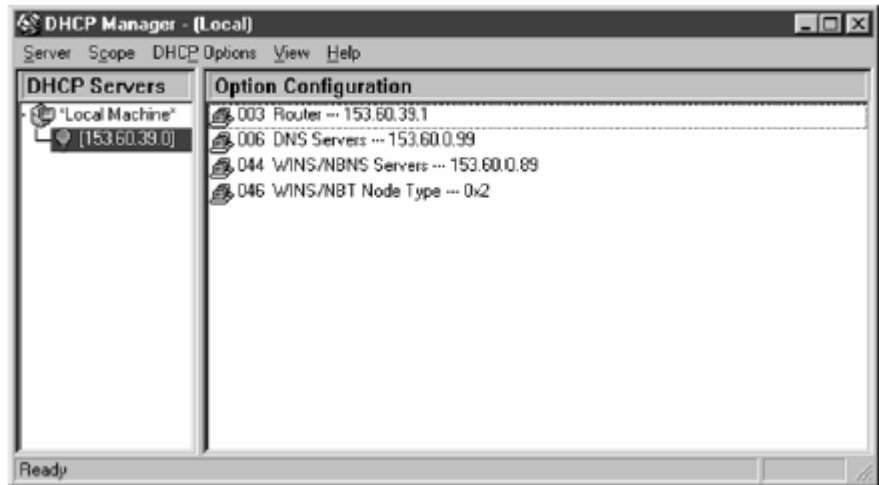
2. Select DHCP Options→Scope.
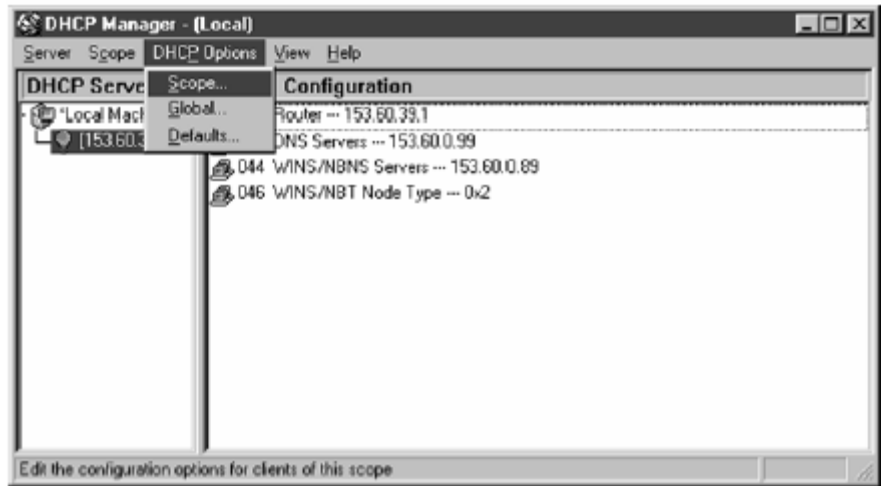
3. Select **043 Vendor Specific Info** and select **Add** to make it an active option.

4. Select **Edit Array** button.

5. Enter the following values in the **Numeric Value Array Editor**:

Value	Description
99	Required
5	Required
153	First Octet for IP address of TFTP server

60	Second Octet for IP address of TFTP server
39	Third Octet for IP address of TFTP server
205	Fourth Octet for IP address of TFTP server
0	Required
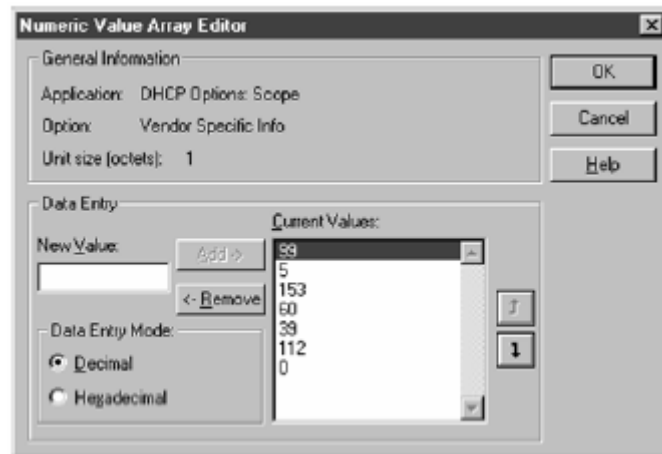
6. Select **OK** to save the values.

Updating Firmware Before RealPrice Base Software Installed

Under normal circumstances a user utilizes server components and diagnostic features released with RealPrice Base software package; however, **a firmware update may be accomplished before the base software is installed**. The following limitations and restrictions apply:

A DHCP server must be configured to specify option 43 (Vendor Specific Info) as described in the previous section.

A native TFTP server must be present. NCR TFTP Server ships and is installed with the RealPrice Base software package.

No diagnostic capabilities are available to assist with troubleshooting.

To use DHCP as a means of initiating a firmware update, the CBS requires that a DHCP server specify a TFTP server name using option 43. The DHCP server must allow for specifying option 43 as an ASCII string representing the TFTP server's IP address in standard dotted decimal notation. See DHCP Server Configuration above.

Using Static IP Addresses

If CBSs are configured to work without a DHCP server (static IP addresses), each CBS uses the address of the RealPrice server as the TFTP server address.

To use this alternate method, the CBS must already be aware of the RealPrice server.

This can only be accomplished if the CBS first establishes a connection with the RealPrice server during normal operation and stores its address in non-volatile memory.

At boot time, the CBS immediately goes to the application image and begins normal operation in the event that it cannot determine the TFTP server address.

NCR TFTP Configuration
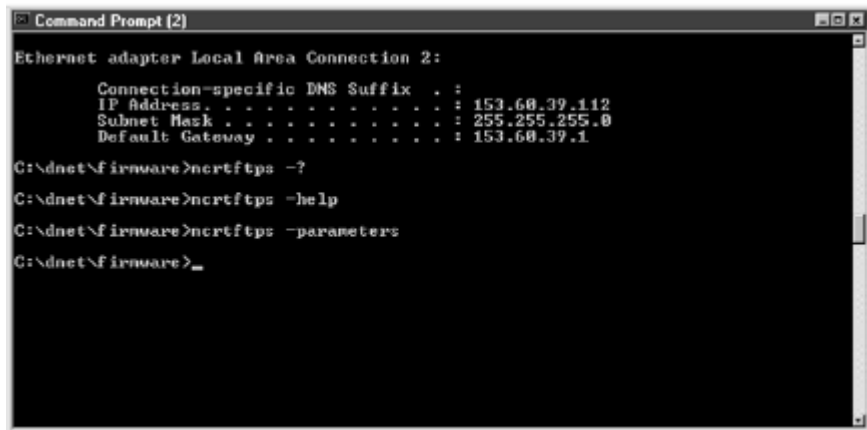
When the RealPrice Base software is installed, the NCR TFTP Server is installed as a service configured to start automatically on reboot. If a different TFTP server is installed and used, the NCR TFTP service needs to be disabled.

The 7730 Firmware Management System (Firmware Bootloader) uses NCRTFTPS to flash application image, the binary image that contains the machine instructions for normal CBS operations.

The NCR TFTP Server can run as either a Windows NT service or an application.

Command Line Parameters

The NCR TFTP Server does not normally provide an interactive user interface when running as a service. It is stopped and started like other NT services, controlled through the Services dialog box in the Control Panel. It may also be started from the command line.

The NCR TFTP Server supports the following command line parameters (preceded by '-' or '/'):

- ? – displays command line parameter help

- help – displays additional product information

- install – installs the service

- remove – removes the service

- status – displays version information and service status

- start – starts the service

- stop – stops the service

- parameters – displays/changes parameters

If NCR Fit Client is installed, RealPrice overwrites the NCR TFTP
server and increases the maximum number of sessions for TFTP server
from default 20 to 40.
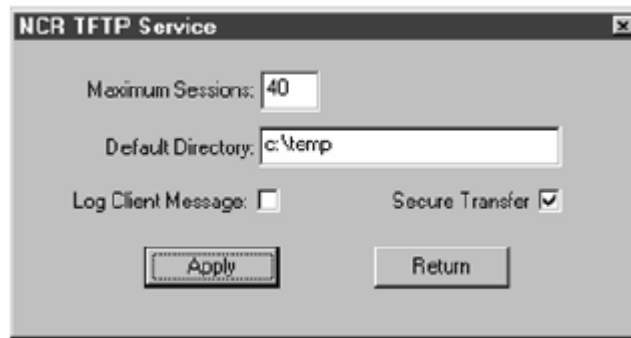
No changes need be made to Default Directory unless running TFTP server on a different server than RealPrice server.

- application – run executable as an application on Windows NT 4.x workstation or server

Appendix A: Parts Order Information

CBS

Model Number

The CBS's twelve-digit model number is located on its name plate. The model number contains important information used to ensure that a replacement CBS matches the site's requirements. The twelve-digit model number is defined in the following illustration.

7730 – 10 11 – 90 90

Class Number ——
Language Code
Power Code
Major Model Code ——
Sub Model Code
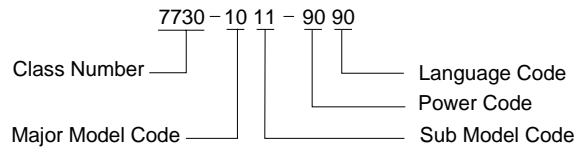
18671

Major Model Code

Major Model Code	Description
10	CBS III
20	CBS III release 3.4

Sub Model Code

The following sub model codes identify the CBS.

Sub Model Code	Description/Version
11	CBS III, 1W, U.S. & Canada
12	CBS III, 500 mW, EMEA
13	CBS III, 500 mW, Netherlands (legacy model - not for

	use in new sites, replaced by 1015)
14	CBS III, 100 mW, France
15	CBS III, 100 mW, Denmark, Italy, Netherlands, Norway
16	CBS III, 1W, Australia

Language Code

The following is the language code.

Language Code	Description
90	No language characteristics

Power Code

The following is the power code.

Power Code	Description
90	The CBS does not have an internal power supply. It receives power from the CBS power supply.

Kit Numbers

The following kits support RealPrice System installations.

Category	Kit Number	Description
Antenna	7730-K050-V003	Receive antenna kit, plenum rated
	7730-K053-V001	Kit-Transmit antenna w/cable
	7730-K054-V003	Kit-Receive antenna w/15 m cable (for 100 mW CBS)
	7730-K055-V002	Kit-Receive antenna (6m lead) and 12m cable
	7730-K056-V001	Kit-Receive antenna (6m lead) and 9m

		cable
	7730-K057-V001	Freezer Mounting Bracket
ESL	7730-K100-V006	Kit-ESL, Single Facing 2x5
	7730-K110-V006	Kit-ESL, Single Facing, 3+2, Black
	7730-K200-V006	Kit-ESL, Small 2x5
	7730-K210-V006	Kit-ESL, Small 2x5, w/icon
	7730-K230-V006	Kit-ESL, Small 2x5, UK
	7730-K270-V006	Kit-ESL, Small, 4+5
	7730-K300-V006	Kit-ESL, Standard, 4+8
	7730-K301-V006	Kit-ESL, Standard, 4+8, Freezer
	7730-K310-V006	Kit-ESL, Standard, 1x8
	7730-K311-V006	Kit-ESL, Standard, 1x8, Freezer
	7730-K320-V006	Kit-ESL, Standard, 3x6, w/ icon
	7730-K321-V006	Kit-ESL, Standard, 3x6, w/ icon, Freezer
	7730-K330-V006	Kit-ESL, Standard, 4+8, UK
	7730-K331-V006	Kit-ESL, Standard, 4+8 UK, Freezer
	7730-K340-V006	Kit-ESL, Standard, 5+5
	7730-K341-V006	Kit-ESL, Standard, 5+5, Freezer
	7730-K350-V006	Kit-ESL, Standard, 3x
	7730-K351-V006	Kit-ESL, Standard, 3x, Freezer
	7730-K360-V006	Kit-ESL, Standard, 1x8, w/icon
	7730-K361-V006	Kit-ESL, Standard, 1x8, w/icon, Freezer

	7730-K370-V006	Kit-ESL, Standard, 4+5
	7730-K371-V006	Kit-ESL, Standard, 4+5, Freezer
	7730-K400-V006	Kit-ESL, Small Signage, 1x6
	7730-K410-V006	Kit-ESL, Small Signage, 1x6, Rail Mount
	7730-K490-V001	Kit-Slider, Small Signage, Transparent
	7730-K491-V001	Kit-Slider, Small Signage, Transparent, Without Divider
	7730-K500-V006	Kit-ESL, Large Signage, 2x6
	7730-K510-V006	Kit-ESL, Large Signage, 2x6, Rail Mount
	7730-K590-V001	Kit-Slider, Large Signage, Transparent
Clips	7730-K890-V001	C-channel clips, 0 degree
	7730-K891-V001	C-channel clips, 25 degree
	7730-K892-V001	C-channel clips, 40 degree
	7730-K893-V001	ESL Spring Clip, 15 degree
Power Supply	7730-K0113-V001	CBS II central power supply kit 7730 release 3.4 48V power supply, US version
	7730-K0124-V001	7730 central power supply kit, int'l bare wire plug 7730 release 3.4 48V power supply, International version
	7730-K013-V001	7730 release 3.4 48V power supply, US version
	7730-K014-V001	7730 release 3.4 48V power supply, International version

RBA Modules	7730-K070-V001	Kit of five (5) US (-1.5 dBm) RBA modules
	7730-K071-V001	Kit of five (5) EU (10 dBm) RBA modules
	7730-K090-V001	NCR 7730 DecisioNet Overlay Application Services – 10 pieces

10/100 Unmanaged Switches

The following auto-sensing unmanaged switches may be used as Ethernet 100Base-T compatible hubs in RealPrice Systems.

Supplier Part Number	NCR Class Number NCR Part Number	Description
AT-FS708-10	7533-0003-0000 877-0152823	8-port 10/100 with internal power supply and U.S. power cord
AT-FS708E-10	7533-0001-0000 877-2270037	8-port 10/100 with external power supply and U.S. power cord

Cable Numbers

The following cables support RealPrice System installations.

Category	Cable Number	Part Number	Description
CBS	1416-C465-0018	230-0146539	Cable-TX Antenna, 1.8m, TNC to RP SMA, plenum rated (discontinued)
	1424-C057-0180	230-0134951	Cable-RX Antenna, 18m, BNC to BNC, plenum rated
	1416-C520-0150	230-0134953	Cable-RX Antenna, 15m, BNC to BNC, plenum rated (100 mW CBS)
Power Supply	1416-C463-9999	497-0413234	Cable – Central power supply pigtail

Part Numbers

The following list identifies RealPrice component part numbers used when ordering replacement parts.

Part Name	Part Number
CBS III, 1W, U.S. & Canada	497-0428071
CBS III, 500 mW, EMEA	497-0428072
CBS III, 500 mW, Netherlands	497-0428073
CBS III, 100 mW, France	497-0428074
CBS III, 100 mW, Denmark, Italy, Norway, Netherlands	497-0428075
CBS III, 1W, Australia	497-0428076
Kit, Receive antenna w/18m cable	497-0421212
Kit, Receive antenna w/15 m cable (for 100 mW CBS)	497-0422223
Kit-Transmit antenna w/cable (discontinued)	497-0422220
CBS II central power supply kit	497-0421230
7730 central power supply kit, int'l bare wire plug	497-0421229
Antenna mounting hardware	497-0414027
Cable-TX Antenna, 1.8m, TNC to RP SMA, plenum rated	230-0146539
Cable-RX Antenna, 18m, BNC to BNC, plenum rated	230-0134951
Cable-RX Antenna, 15m, BNC to BNC, plenum rated (100 mW CBS)	230-0134953
Cable – Central power supply pigtail	497-0413234

Glossary

A

Antenna

A device used to transmit and receive RF communication between a CBS and ESLs. One transmit and up to four receive antennas may be attached to each CBS. Antennas are usually installed on the ceiling.

ARP (Address Resolution Protocol)

A network communication protocol used to provide a cross reference between MAC addresses and IP addresses.

Attachments

Mounting devices used to attach ESLs to shelf rails.

B

Base Runtime Software

A software application for the RealPrice System that runs on the RealPrice Software Controller and is not dependent on the type of POS system used. The Base Runtime Software controls the core RealPrice functionality such as initialization of a ESL, display of price on an ESL, and diagnostics.

C

CBS (Communication Base Station)

CBSs receive and transmit data and control functions to the ESLs. Up to 40 CBSs can be installed in a store. One CBS is defined as the primary CBS and the others as secondary CBSs. CBSs are usually installed in the ceiling.

CBS Power Supply
This external AC/DC converter supplies DC power to a maximum of three CBSs. An additional CBS Power Supply is required for each additional group of three CBSs.

Country Code Keys
CBS parameters that identify the power level, number of frequency bands, and the operating frequencies specific to each CBS model.

Coverage Area
An area within a store where there is reliable RF communication between CBSs and ESLs. More than one CBS is required in a large store to attain adequate transmission reliability.

E

ESL (Electronic Shelf Label)
An ESL is the device attached to the store shelf that displays information for the customer.

I

Install Mode
A CBS operating mode where all CBS's communicate with ESLs using the odd numbered timeslots (1-23). This mode is used when running installation and test utilities; Initial Load, RF Certification, and dncalib, and is not intended for normal day-to-day operations.

IP (Internet Protocol)

IP Address
An address format (xxx.xxx.xxx.x) used to communicate with devices or components in a network.   The format includes network IDs, subnetwork IDs, and host IDs.

ISP (In-Store Processor)
The computer in the store that contains the price database used by the POS system. The ISP integrates PLU information into the RealPrice System.

M

MAC (Medium Access Control)

A communications protocol. The MAC protocol is used to provide the data link layer of an Ethernet LAN system.

N

Normal Mode

A CBS operating mode where each CBS communicates with its assigned ESLs using 2 of the 24 available timeslots, such as 1-13, 2-14, 3-15, and so forth. This mode is used for *normal* day-to-day store operations to provide the minimum amount of communication air time resulting in the most efficient environment for co-existence with other RF devices in the store.

R

RealPrice Database

A MySQL database used to store information relative to all ESL management.

RealPrice Software Controller

This refers to the In-Store Processor (ISP) or a Dedicated PC (DPC). This is the computer physically connected to the primary CBS that sends price information from the PLU file to the RealPrice System for display on ESLs.

RealPrice Standalone System

A system that runs the RealPrice Software on a dedicated PC separate from the ISP. In this situation the DPC has a copy of the store data base and communicates with the ISP to receive maintenance (price update) data.

RF (Radio Frequency**)**

S

Store ID

A unique number is assigned to each store and used by the RealPrice System to prevent unintentional transmission of signals between stores.

<u>T</u>

Time Slot

> A unit of time assigned to each ESL during which a CBS transmits either a downlink message to an ESL, or receives acknowledgements (ACKs) back from an ESL. Each CBS is assigned 2 time slots.

<u>U</u>

Uplink

> An uplink is an acknowledgment message (ACK) sent from an ESL to a CBS in response to a downlink burst.

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