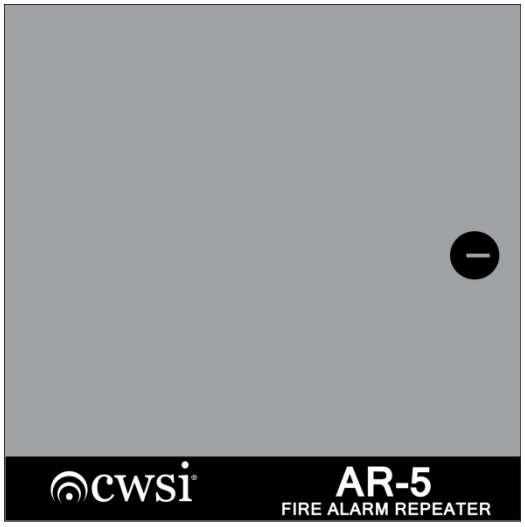
AR-5 WIRELESS FIRE ALARM REPEATER
RB-10, RB-20, RB-30, RB-40 RELAY BOX



OPERATING and INSTALLATION
INSTRUCTION MANUAL

CWSI by Tyco Fire & Security GmbH

P/N IM-AR5 Rev. F

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Introduction

This manual is intended for persons involved with the installation, maintenance and operation of the AR-5 RF repeater. It is a comprehensive guide that provides details on product operation and should be kept for future reference. This manual consists of separate sections. Each section contains information in a manner as to be clear as possible. It is designed to provide all the information necessary to install, program and operate the equipment. Read and understand this manual prior to installing or operating the equipment. It is imperative that the installer understand the requirements of the Authority Having Jurisdiction (AHJ) and be familiar with the standards set forth by Underwriters Laboratories, NFPA 72 National Fire Alarm Code, and NFPA 70 National Electrical Code.

The model AR-5 is the first in a series of wireless repeaters manufactured by CWSI. This repeater was designed and tested to comply with **NFPA 72 National Fire Alarm Code and UL 864 standard.**

FCC Statements

FCC Warning

Important: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Warning – RF Exposure

Important: When using this device, a certain separation distance between antenna and nearby persons has to be kept to ensure RF exposure compliance. In order to comply with the RF exposure limits established in the ANSI C95.1 standards, the distance between the antennas and the user should not be less than [20cm].

Section 1 - Description and Features

1.1 Product Description and Wireless System Overview

The CWSI AR-5 is an intelligent addressable wireless fire alarm repeater. It will receive and retransmit signals to and from CWSI control panels, devices and repeaters as listed in the compatibility section of this manual. It has two on board transceivers that allows all communications with devices to be done via radio frequency (RF). The AR-5 will receive and retransmit alarm, supervisory, and trouble signals from the devices to the control panel. Since the communications are bi-directional the repeater can retransmit RF command signals from the control panel to activate its NAC circuits and relays. The repeater will also retransmit control panel commands to perform functions including turning on or off tandem detector sounders. The AR-5 NAC circuits and optional relays are field programmable at the CP-3600(+) control panel making site specific changes cost effective. The AR-5 notification appliance circuits supply 24 volt DC with Class A or B operation. Models RB-10, RB-20, RB-30, RB-40 relay boxes are available containing 10 to 40 dry contact programmable relays. These relay boxes can be connected to the AR-5 providing up to 40 dry contact relay outputs. Additionally there is a 5 relay sub assembly module RM-5 which can be plugged directly into the AR-5 board.

The CWSI initiating devices contain microprocessor based transceivers and are battery powered. Bi-directional repeaters are used to create a cellular network type signaling path to and from the control panel. Initiating devices transmit trouble, supervisory and alarm information. Repeaters process the data and retransmit the data through the repeater network to and from devices and the control panel. All transmitted signals are verified for data integrity, signal quality and reception conformation.

The AR-5 repeater has many new and enhanced features unavailable in previous wireless systems due to recent technological advances. These features and industry advancements are what make CWSI the unsurpassed leader in the wireless fire alarm industry.

1.2 Features

- Bi-Directional RF communication
- 900 MHz Frequency Hopping Spread Spectrum format
- CRC data validation
- Dual transceiver design
- 60 hour battery standby time
    - ✓ Field programmable Special Application NAC circuits
    - ✓ 1 Class A 24 Volts DC @ 1 Amp
    - ✓ 2 Class B 24 Volts DC @ 1 Amp each
    - ✓ 1 Class A 24 Volts DC @ 100 Milliamps Regulated
    - ✓ 2 Class B 24 Volts DC @ 100 Milliamps each Regulated
    - ✓ NAC outputs are non-power limited and over current protected
- Synchronization of NAC outputs when used with compatible Gentex products
- Up to 40 N.O. programmable dry contact outputs *
- Wireless activation of NAC circuits and relays
- Optional 5 relay dry contact output module model RM-5

*With optional relay module RB-40 attached

1.3 Specifications

Power Source: 120/240 VAC 50/60Hz 1 Amp dedicated circuit.

Batteries: Two 12Vdc 4Ah sealed lead acid batteries connected in series. Use only Genesis/Enersys P/N NP4-12.

Operating Temperature: 32 to 145* degrees F Humidity 85% non-condensing.

Special Application NAC Output ratings:

- Class B – 2 output circuits
  - Non power limited over current protected
  - 24 Volts D.C. @ 1 Amp each
- Class A – 1 output circuit
  - Non power limited over current protected
  - 24 Volts D.C. @ 1 Amp

Regulated NAC Output ratings:

- Class B – 2 output circuits
  - Non power limited over current protected
  - 24 Volts D.C. @ 100 Milliamps each
- Class A – 1 output circuit
  - Non power limited over current protected
  - 24 Volts D.C. @ 100 Milliamps

Dry Contact Relays:

Available when optional model RB-10, 20, 30 or 40 relay box or RM-5 relay module is connected to the AR-5. RB relay outputs are programmable and rated 24 Vdc @ 1Amp and RM-5 outputs are rated 30Vdc @ 5A. The number after RB indicates the number of outputs provided. The RM-5 has 5 relay outputs.

Transceiver Operating Frequency: 900 MHz band.

Signal to Noise Ratio: Minimum Signal -100.2dBM Maximum Noise -115.3dBM

Antenna Type: Omni, Yagi

Transmission Format: Frequency Hopping – Spread Spectrum.

Dimensions: 10” high, 10” wide, 3 ¼” deep

Enclosure: Powder coated 18 gauge steel

Weight: 14 Lbs.

RB-10, 20, 30, 40 Ratings @ 24Vdc

	Standby mA	Alarm mA
RB-10	2	110
RB-20	4	220
RB-30	6	330
RB-40	8	440

*Transient operation.

CASE DIMENSIONS

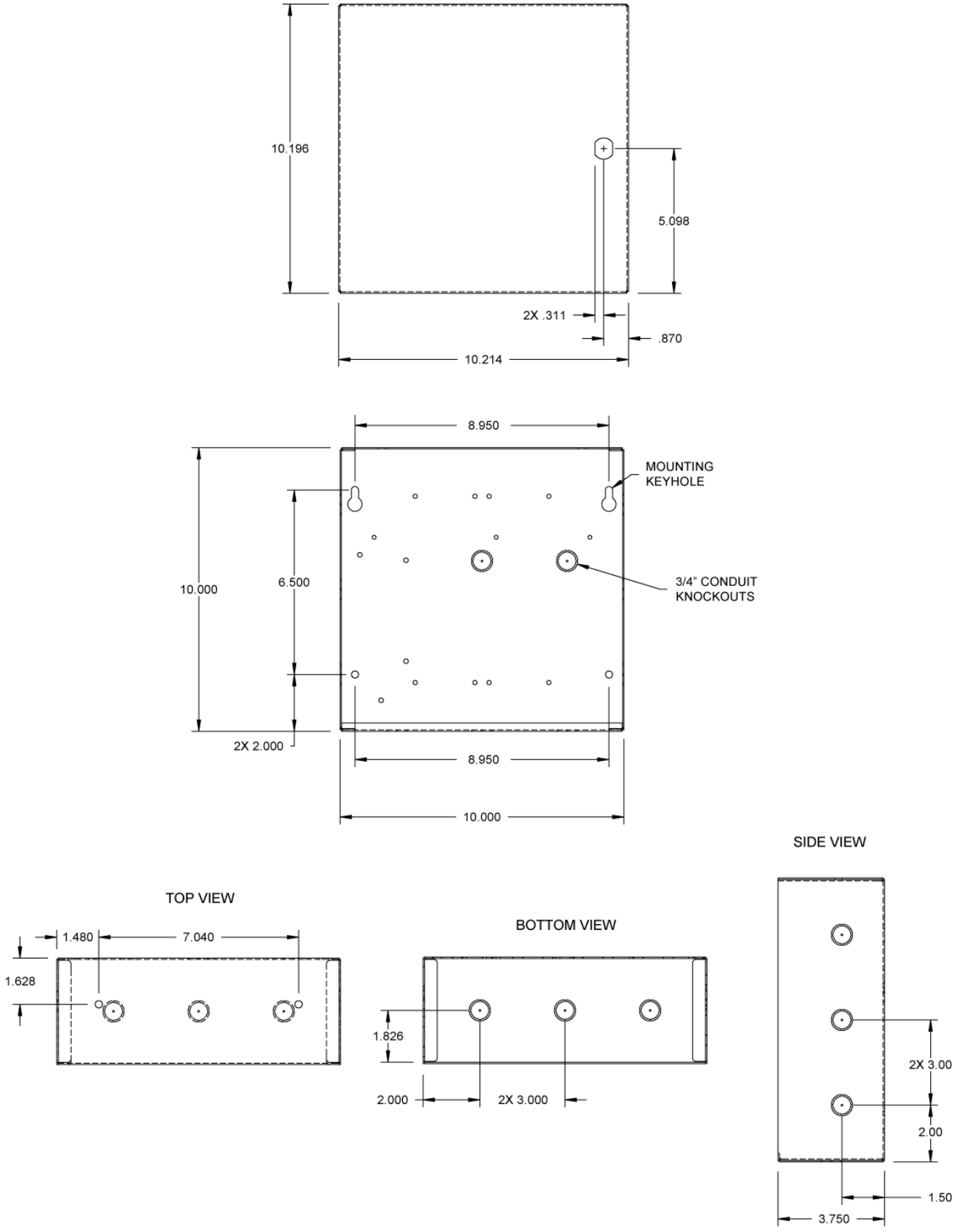

Figure 1

Section 2 - Compatibility

2.1 Compatible Equipment and Accessories

Refer to the CWSI control panel manual for complete compatibility details

The following antennas are for use with the AR-5 repeater:

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Models: OM-1 Omni – Isotropic gain 2.5 dBi, OM-2 Omni – Isotropic gain 1 dBi, OM-3 Omni – Isotropic gain 5 dBi, YA-1 Yagi – Gain 15.2 dBi

The following accessories are for use with the AR-5 repeater:

Tyco Fire & Security GmbH

Models:

RB-10, RB-20, R-30, RB-40 Relay Boxes, RM-5 Relay output sub assembly module

CWSI-BPF-915 Optional Band Pass Filter for Antenna SMA connector

Notification Appliances:

As listed in the Notification Appliance Compatibility section of this manual

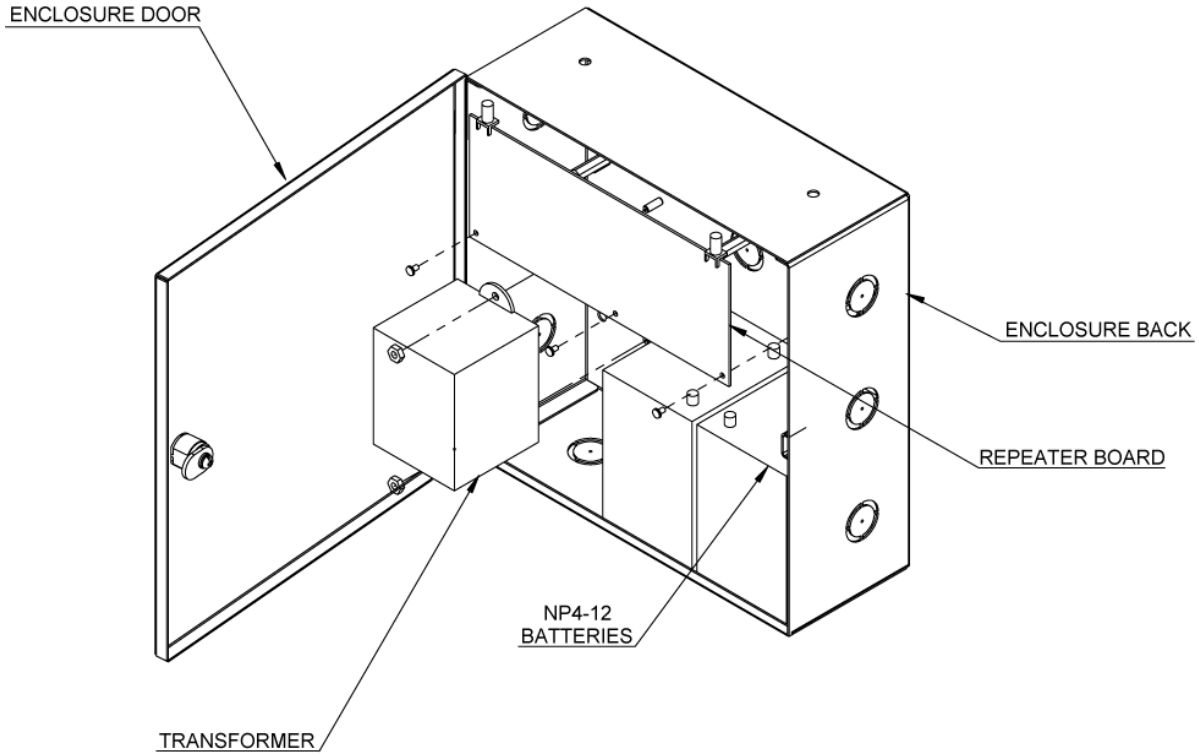

Figure 2

Section 3 - Installation

3.1 Preparing the Installation Site

Prior to the installation of an AR-5 repeater a signal survey must be performed by a factory trained technician or authorized dealer. The signal survey determines the locations of the repeaters in order to receive the devices. Refer to the Signal Survey section in this manual and individual CWSI device manuals for the proper method to conduct a signal survey. The completed survey becomes the blueprint layout for the actual installation.

During the survey, try to locate AR-5 repeaters close to available 120/240 VAC uninterruptible power. All AR-5 connections must be installed in conduit. When connecting primary A/C power always follow:

1- National Fire and Electrical Codes (NFPA 72 and NFPA 70)
2- Local Electrical and Fire Code requirements
3- Local AHJ (Authority Having Jurisdiction) requirements
WARNING: Make sure A/C supply is turned OFF prior to connecting the AR-5 repeater.

3.2 Receiving and Unpacking the Equipment

Upon receiving the equipment, the carton should be inspected for damage, which may have occurred during shipment. Each package should be checked against the packing slip for completeness. Differences should be reported to CWSI immediately. If any product is suspected of damage it should be checked for proper operation or returned to CWSI.

3.3 Installing the AR-5 Repeater

WARNING: This equipment must be professionally installed by factory trained personnel. Use of an antenna other than listed in the compatibility section of this manual may be harmful to persons, void FCC or damage the equipment.
The AR-5 repeater unit must be enrolled into the CP-3600(+) control panel to function properly. This will validate the repeater as being part of the installation and allow the installer to program relay outputs, unit description etc. as needed for the installation. **Note: Always attach a compatible antenna to both repeater sma connectors A and B prior to applying power to the repeater, enrolling the repeater or conducting a signal survey.** There are three antennas available for use with the AR-5 repeater. The differences are the type and gain. The OM-1 Omni antenna should be used except where installation space restrictions are an issue. The OM-2 Omni will have slightly lower gain and is shorter which may be helpful in space restricted areas. The OM-3 will have increased range over the OM-1&2 where longer omni directional reception is needed. The YA-1 is a directional Yagi antenna with high gain for signal reception at longer distances. Typical antenna configurations are shown in figure 1A.
To install the YA-1 follow these steps:

1. Perform a signal survey to determine an acceptable indoor location.
2. Attach the mounting brackets to a suitable surface.
3. Fasten the 24” mast to the mounting brackets and tighten the nuts.
4. Attach the YA-1 to the top of the mast and **make sure the elements are in a vertical position.**
5. Aim the antenna towards the desired reception location making sure none of the elements make contact with any surrounding surfaces or objects then tighten the antenna bracket.

6. Connect the supplied cable between the repeater and the antenna. The cable should be within the same room and not routed near electrically noisy sources such as fluorescent lights or electrical outlets.
7. Perform a signal survey after the antenna is mounted.

Typical Antenna Configurations

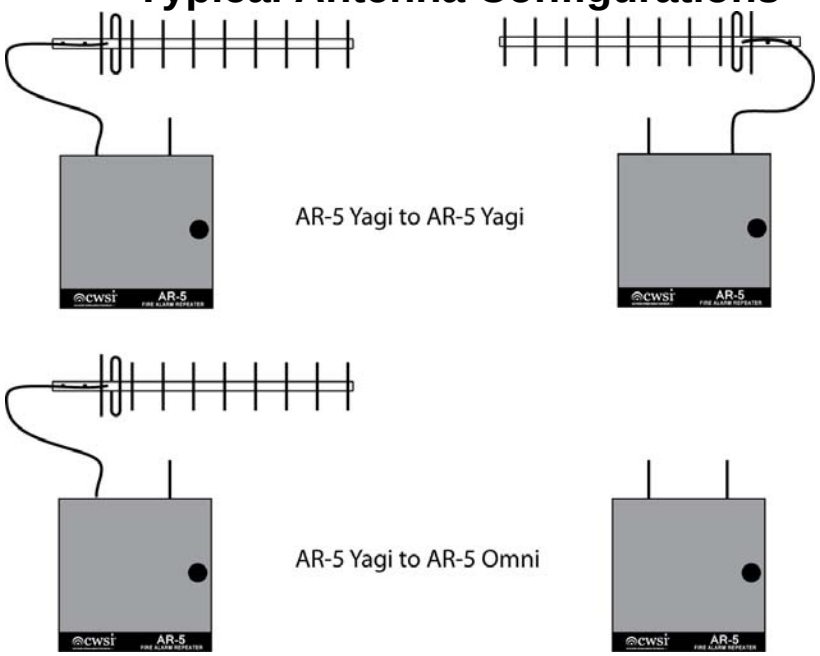

Figure 1A

Always perform the signal survey with the antenna that will be used on the repeater when it is installed. Enrollment can only be accomplished with the repeater within reception range of the CP-3600(+) or at the intended mounting location as long as it can communicate with another **enrolled** repeater. Follow the enrollment instructions in the CP-3600(+) manual. After enrollment, it is recommended to hold the repeater in the intended mounting location and verify a good signal survey prior to permanently mounting the unit. Upon enrollment and conducting a signal survey the repeater can be mounted in its intended location. The following must be considered and or adhered to when mounting the unit.

1 – All wiring should comply with national and/or local electrical codes. Unless otherwise specified, wire should be 18 gauge copper with 600 Volt insulation. Shielded wire is preferred.
2 – This unit is intended to be mounted in indoor dry areas. Avoid dusty, wet and corrosive locations.
3 – Mount the AR-5 Repeater at least 8 feet high.
4 – Provide adequate space surrounding the unit to allow for;
- **a – Allow enough room for the hinged cover to be completely opened for easy access to internal components and wiring.**
- **b - The connection of conduit to the desired cabinet locations.**
- **c – The attachment of omni antennas to both antenna sma connectors.**

5 – Avoid electrically noisy locations such as main electrical and transformer rooms, computer rooms, telephone switching rooms, etc.

Unlock the AR-5 cover and open the unit. Carefully verify that the unit is not damaged and the printed circuit board is properly secured and connected to the transformer. Hold the AR-5 in its intended position, verify leveling then mark the location of the upper corner mounting keyholes *(Figure 3)*. Using adequate mounting screws and anchors, secure the AR-5 repeater to the mounting surface. Be sure to install screws in the two lower mounting holes. The conduit can now be installed into the provided knockout locations. **Power limited and non-power limited wiring must be in separate conduit and kept a minimum of .25" apart in the enclosure.** Refer to *figure 3* for suggested wire routing. **WARNING: Make sure A/C supply is turned OFF prior to proceeding with A/C connection.** The AR-5 can accept 120 or 240Vac 50/60 Hz power. The transformer wiring configuration is different for each voltage. **Warning: If the transformer is wired incorrectly damage to the transformer, AR-5 board or injury to the user can result.** Refer to the wiring diagram for proper connection of the desired input power. Use minimum 14 AWG 600 Volt copper wires for A/C connections. Follow all applicable electrical codes. Attach compatible antennas to both SMA connectors A and B at the top of the cabinet. If the repeater has not yet been enrolled into the CP-3600(+) facp then make sure the CP-3600(+) is in enrollment mode **before** applying A/C power. Verify SW2 switch 4 is off and 5 is on to enroll into the CP-3600(+). Apply A/C power and connect the backup batteries. The repeater sounder will beep twice on power up. This is normal. Verify the green power led is on steady. If it is not on or is blinking then verify the following:

1) Proper input voltage is present at transformer input.
2) Transformer secondary connector is correctly plugged into repeater board connector labeled J4.

If the repeater doesn't show an indication on the CP-3600(+) that it has been enrolled then it could be out of range or the base code may have to be cleared. The repeater must be in range of the CP-3600(+) or another enrolled repeater in order for it to enroll into the system. Instruction on clearing the base code can be found in the clearing the base code section of this manual.

After the repeater is enrolled and power has been applied the repeater will transmit a power up reset trouble to the CP-3600(+). This is expected on power up and does not indicate a problem with the repeater. Reset the CP-3600(+) and the trouble should not come back. If the trouble reoccurs while the repeater has power then this is an indication of a problem with the unit. A low battery trouble may occur when the repeater is powered if the battery is low or was not connected within 200 seconds. Reset the panel after both A/C and the batteries have been connected and the trouble condition should only reoccur if it is due to low batteries or faulty battery wiring. If the batteries are low the trouble will keep occurring until they are charged above low battery threshold. If a hardware fault trouble is shown on the CP-3600(+) after enrolling the repeater, check the SW2 switch 4 and 5 settings. This switch must properly set when enrolling into a CP-3600(+) control panel. There are leds located on the repeater pc board under each transceiver. These leds will begin to flash after the repeater is enrolled and network communication is established. These are basic indicators and are not to be used to determine operational status of the repeater.

3.3.1 Backwards Compatibility

The AR-5 Rev. 3.0 repeater can be used in an installation containing a CP-3500D or CP-3000(A)(D)(DA) and AR-3 repeaters. The AR-5 must be properly configured to be backwards compatibility in an installation containing CP-3500D or CP-3000(A)(D)(DA) and AR-3 repeaters. To make the AR-5 Rev. 3.0 backwards compatible with the CP-3000(A)(D)(DA) and AR-3, set SW2 switch #5 to the AR3 position. To make the AR-5 Rev. 3.0 backwards compatible with the CP-3500D and AR-5 Rev. 2.0, set SW2 switches #4 and 5 to the on (left) position. Power cycling of the AR-5 will

be necessary if this switch is changed while power is applied. Except where noted all new features of the AR-5 will be available when it is used in backwards compatibility mode.

3.3.2 The Backup Batteries

The cabinet houses two 12 Volt 4Amp hour batteries wired in series. Use only Genesis/Enersys P/N NP4-12. These batteries will supply 60 hours of backup power followed by 5 minutes of alarm time at maximum load as specified in this manual. Refer to figure 3 for proper battery connection wiring. A low battery trouble will be transmitted to the CP-3600(+) if the batteries are low or disconnected. After the batteries are connected to the repeater the CP-3600(+) can be reset. If the repeater continues sending the trouble condition, check for proper battery connections. If the batteries are low or bad the low battery trouble will keep reoccurring until they are charged or replaced with charged batteries.

3.3.3 Clearing the Base Code

A repeater that has been previously enrolled into a CP-3600(+) will have the base code of the CP-3600(+) in its memory. If the CP-3600(+) base code is changed or the repeater is used in another installation with a base code different than the previous system, then the old base code will need to be cleared from the repeater. The repeater will not be recognized until the base code is cleared.
To clear the base code power up the repeater on battery, A/C or both. Press and hold the survey button continuously for 15 seconds and a long tone will be heard from the sounder. This is the indication that the code has been cleared. Refer to figure 3 for the survey button location. Remove all power from the repeater. The repeater can now be enrolled into the system with the new base code.

3.3.4 Permanently Removing a Repeater

To permanently remove a repeater from the installation after it has been enrolled, it must be deleted from the CP-3600(+) control panel. Refer to the CP-3600(+) manual to delete a repeater from the installation. **Always remove all power from the repeater being removed and allow it to show a test failure trouble on the CP-3600(+) prior to deleting it.** When a repeater is deleted from the CP-3600(+), a signal is sent to the repeater which will disable its transceivers. This is a failsafe in case the repeater was not powered down prior to deletion. This prevents installed transmitters and other repeaters reporting to the deleted repeater.

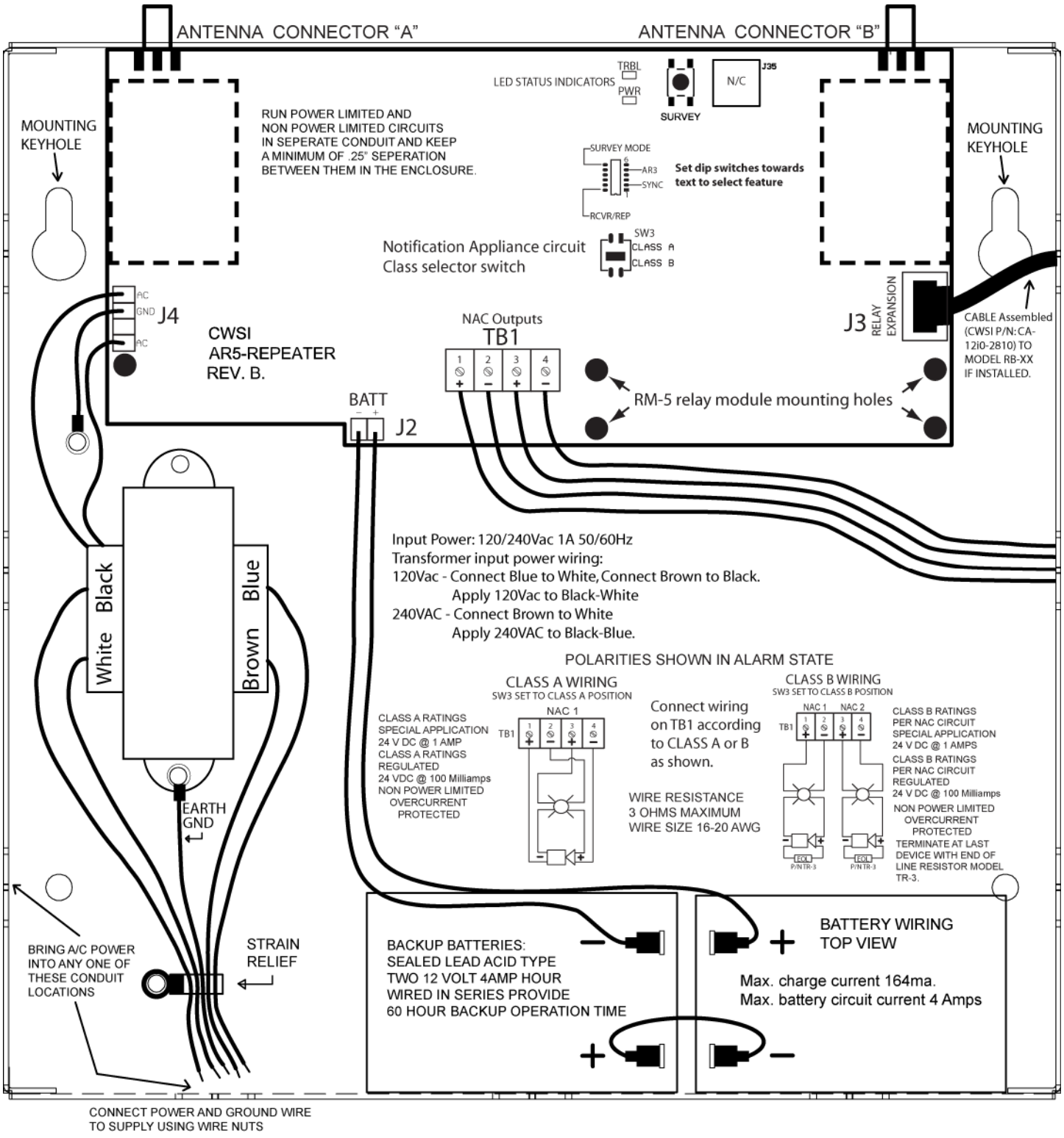

Figure 3

Section 4 - Operation

4.1 Indicators, Signals and Switches

This section will explain LED, Sounder and Switch functions. Refer to figure 4. This section also lists trouble signals that may be generated by a repeater.

4.1.1 LEDS

The repeater board contains two led indicators for the following:

PWR – This green led indicates the status of the incoming A/C voltage. On steady indicates proper A/C voltage is present. Off indicates low or improper A/C voltage present.

TRBL – This yellow led indicates a trouble condition exists with the repeater. This led will flash when a trouble condition is present on the repeater. After the trouble is corrected the led will continue to flash until the trouble is reset on the CP-3600(+) facp.

4.1.2 Sounder

The sounder is used as an indicator for signal survey and clearing the repeaters base code. Specifics can be found in the signal survey and clearing base code sections of this manual.

4.1.3 Dip Switch SW2

The SW2 dip switch is located in the upper right side of the repeater pc board. Refer to figure 3. The dip switch is used to select whether the repeater board is a CP-3600(+) receiver or an AR-5 repeater. It also can make a repeater function as a standalone survey unit without being enrolled into a CP-3600(+) facp. Switch position 3 is unused and should be to the right (off) position. Switch position 1 determines if the board is a receiver or repeater. This switch should be left (on) for a receiver and right (off) for a repeater. Switch position 6 is used to make a repeater a standalone survey unit. A receiver cannot be made to function as a standalone unit. Switch 6 should be right (off) for a repeater in normal mode. Switch 2 is for synchronization of the nac circuits when using compatible Gentex products. To activate sync, push switch 2 to the right towards the word sync. Switches 4 & 5 determine RF compatibility. For compatibility with a CP-3600(+) switch 4 must be off and switch 5 must be on. Any dip switch changes will require power cycling the repeater. See the backwards compatibility section for further information.

4.1.4 Trouble signals

This section contains a list of trouble signals that can be transmitted by a repeater. Possible causes are given to help the technician quickly solve the issue. The repeater is continuously monitored for proper operation. If a problem arises then a trouble signal will be sent to the control panel within 200 seconds indicating the trouble condition. The trouble will be retransmitted every 200 seconds until the problem is resolved. Some of the trouble conditions below are self-restoring as noted below with a *. All other troubles will have to be reset at the CP-3600(+) and will not self-restore. The repeater will also send a test signal to the control panel every 200 seconds. If the panel does not receive this signal, a trouble signal will be displayed.

1. **Test Failure*** – Displayed by the CP-3600(+) when it doesn't receive a repeater polling transmission within 200 seconds. Possible causes are a missing antenna(s), break in repeater communications or component failure in the repeater.
2. **Power Loss*** – Caused by low or no voltage present at A/C input to product. Check for proper A/C supply.
3. **Charger Failure** – Caused by problem in battery charging circuit. Factory service is required.

4. **Low Battery** – Caused by battery voltage being too low or battery failing to pass load test. Charge or change the batteries.
5. **NAC Overload -** Caused by exceeding the current rating of one or both of the NAC outputs. Check for shorts and make sure compatible notification appliances are connected in the allowable quantities.
6. **Program Fail –** Caused when the repeater does not acknowledge receipt of a programming command from the CP-3600(+) facp. Make sure the repeater is turned on and is communicating with the CP-3600(+).
7. **EOL Violation -** Caused by an open circuit or short circuit in the NAC wiring or missing TR-3 end of line resistor. The repeater must be able to read the TR-3 end of line resistor. Check for shorts or opens in the wiring and the presence of the eol resistor.
8. **Power Up Reset -** Caused when the repeater processor resets its program. This signal is normal the first time a repeater is powered up. It should not reoccur after the repeater has power applied. If it does then the repeater requires factory service.
9. **Ground Fault* –** Caused by the repeater detecting resistance of 1000 ohms or less between any NAC output line and earth ground. Find the source of resistance and remove it.
10. **Hardware Fault –** Caused by a fault with the repeaters memory or internal circuitry or SW2 #5 not set correctly. If the switch is set correctly then the repeater will require factory service.

*** = Self-restoring**

4.2 Outputs

The AR-5 has 1 class A or 2 class B programmable NAC output circuits available. The AR-5 repeater can also be connected to relay box models RB-10, RB-20, RB-30 and RB-40 via ribbon cable or the RM-5 relay module can be installed to provide dry closure relays. The RB model relay box can supply up to 40 programmable N.O. dry contact outputs and the RM-5 provides 5 form C dry contact outputs. Refer to the relay box section of this manual for further information. All AR-5 NAC and relay output programming is done at the CP-3600(+) control panel. Refer to the CP-3600(+) control panel manual for programming options and instructions. Repeater outputs are detailed in the following sections. Refer to figure 4 for NAC wiring. Wiring diagrams for the RB boxes and RM-5 module can be found in sections 5 and 6 respectively. All diagrams are shown with A/C and battery power connected with the repeater in normal operation mode.

4.2.1 Notification Appliance Circuits (TB1 Terminals 1-4)

The AR-5 repeater provides a notification appliance circuit which is field selectable for either 1 Class A Style Z or 2 Class B Style Y supervised non power limited outputs. Power limited and non-power limited circuits must be separated by at least .25” within the enclosure and run in separate conduit. **Note: All wiring from the TB1 connector must be run in conduit and contained within one room. Use minimum 18 awg wire.** Refer to figure 3 for suggested wire routing. The outputs are supervised for wiring integrity and ground fault. The NAC output voltage is 24 Volts D.C. and the class can be selected with SW3 for either A or B operation as shown in figure 4. The NAC circuit connector is labeled TB1 and located in the middle of the bottom edge of the repeater board. When operating on back up batteries the AR-5 will maintain the NAC circuit output voltage within UL limits until the battery voltage drops below low battery threshold of 20.4 Vdc. The NAC circuits are site programmable for activation and deactivation through the CP-3600(+) control panel. Refer to the programming section of the CP-3600(+) manual for complete activation and deactivation programming options. The circuits utilize current sensing technology and if the rated current draw is exceeded a NAC overload trouble signal will be displayed on the CP-3600(+) and the NAC circuit will deactivate. It will attempt to reactivate only if another device sends an alarm or the NAC circuit is

reset by the control panel and then reactivated by another alarm. In class B operation, an end of line resistor P/N TR-3 must be placed at the last appliance connected to the circuit or an eol violation trouble will be transmitted to the control panel. **Note**: **A TR-3 eol resistor is only required if the NAC outputs are programmed to activate.** A trouble will also be transmitted if a ground fault of 1000 ohms or less is present on a NAC circuit. Figure 4 shows proper wiring of NAC circuit. Table 1 shows compatible notification appliances. Synchronization of Gentex model horns and strobes can be achieved by setting SW2 #2 to the sync position. When sync is selected the AR-5 will automatically synchronize compatible Gentex models on each NAC and between NACs without the use of an external sync module. All other model compatible horn and strobe synchronization is achieved by using one of the compatible synchronization modules. The NAC outputs can also be synchronized together using the listed sync modules.

NAC Output ratings:
Special Application NAC Output ratings:
- Class B – 2 output circuits
  - Non power limited over current protected
  - 24 Volts D.C. @ 1 Amp each
- Class A – 1 output circuit
  - Non power limited over current protected
  - 24 Volts D.C. @ 1 Amp

Regulated NAC Output ratings:
- Class B – 2 output circuits
  - Non power limited over current protected
  - 24 Volts D.C. @ 100 Milliamps each
- Class A – 1 output circuit
  - Non power limited over current protected
  - 24 Volts D.C. @ 100 Milliamps

4.2.2 Notification Appliance Compatibility

The following UL Listed notification appliances are compatible with the AR-5 repeater.

Table 1

MANUFACTURER	MODEL NUMBER	TYPE	MAX PER NAC
CWSI	520(R)(W)	LOW FREQ	N/A
CWSI	MH(R)(W)	MINI HORN	N/A
GENTEX	GX93-(W)(R)	MINI HORN	20
GENTEX	GEC-24-15/75-(WR)(WW)	HORN/STROBE	6
GENTEX	GEC3-24-(WR)(WW)	HORN STROBE	4
GENTEX	GEC24-177-(WR)(WW)	HORN STROBE	3
WHEELOCK	HSR/HSW	HORN/STROBE	4
WHEELOCK	DSM-12/24-R	SYNC MODULE	1
SYSTEM SENSOR	P2R/P2W	HORN/STROBE	4
SYSTEM SENSOR	MDL3R or MDL3W	SYNC MODULE	1
SYSTEM SENSOR	R-20E	RELAY	4*

CONTACT MANUFACTURER FOR COMPLETE PART NUMBERS AND OPTIONS. REFER TO MANUFACTURER DOCUMENTATION FOR PROPER WIRING OF SYNC MODULES

*** UP TO 4 RELAYS CAN BE CONNECTED WITHOUT ANY NOTIFICATION APPLIANCES CONNECTED OR SUBSTITUTE 1 RELAY FOR 1 NOTIFICATION APPLIANCE IF USED TOGETHER. WHEN USING R-20E RELAYS THEY SHOULD BE CONNECTED DIRECTLY TO THE NAC OUTPUTS BEFORE THE SYNC MODULE. DO NOT USE THE R-20E ON A NAC WITH GENTEX SYNC OPTION ON.**

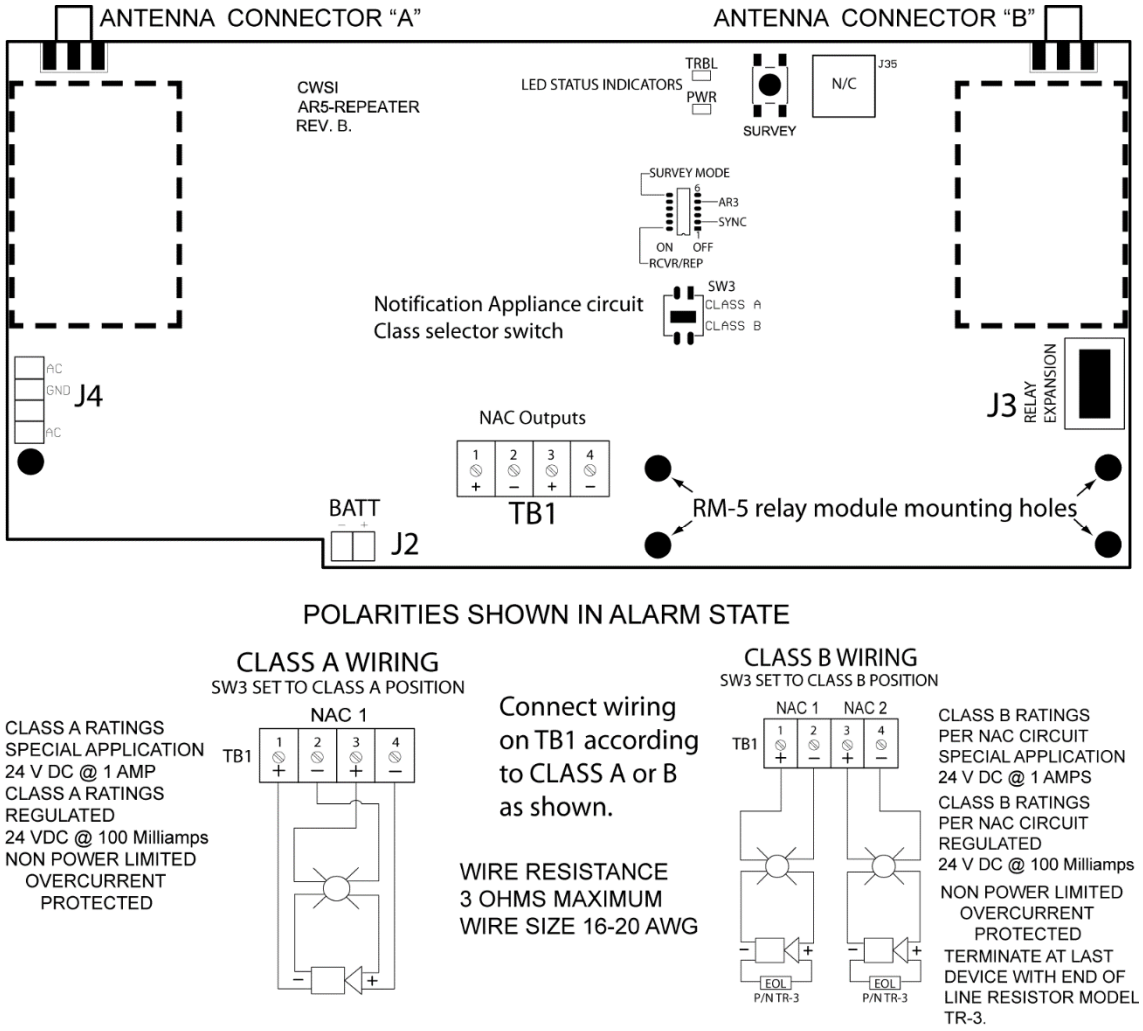

Figure 4

4.2.3 USB Jack J35

This connector is for factory use only. Refer to figure 4 for location.

Section 5 – Optional Model RB Relay Boxes

5.1 Description

The RB relay box is an optional accessory for connection to the AR-5 repeater. It provides up to 40 normally open dry contact outputs. The number of relays corresponds to the model number of the unit for example RB-10 is a ten relay box. Relay boxes can be ordered in increments of ten relays. The relay box is connected to the AR-5 repeater with a cable run through conduit. The enclosure is the same as a repeater.

5.2 Installation

Follow the instructions found in section 3.3 for mounting the enclosure. The relay box must be mounted directly to the right and within 6 inches of a repeater as shown in figure 6. Power down the AR-5 repeater then connect the jumper cable P/N CA-12i0-2810 from J3 on the AR-5 repeater board to J1 on relay board #1 in the relay box. **Warning: The relay box may be damaged if the power is not removed from the repeater prior to connecting it to the relay box.** The cable must be run in conduit. Cable connections are keyed to insure proper connection. The relay box will not function without this cable connected.

5.2.1 Wiring

Refer to figures 6 and 7 for wire routing and relay connections. The terminal blocks are of the plug in type in order to make wiring easier. Simply connect the wires to the terminal blocks while unplugged and then insert them into the appropriate locations to make the relay connections. Follow all NFPA and local electrical codes when wiring this product. Acceptable wire size is 16-22 awg. Relay box outputs are to be connected to power limited circuits only. Relay contacts are rated at 24Vdc 1A resistive.

5.2.2 Programming

Many programming options are available for the relay unit. Since relay activation and deactivation is programmed at the CP-3600(+) control panel, please refer to that manual for programming options and instructions.

MODEL RB-40 RELAY BOARD LAYOUT

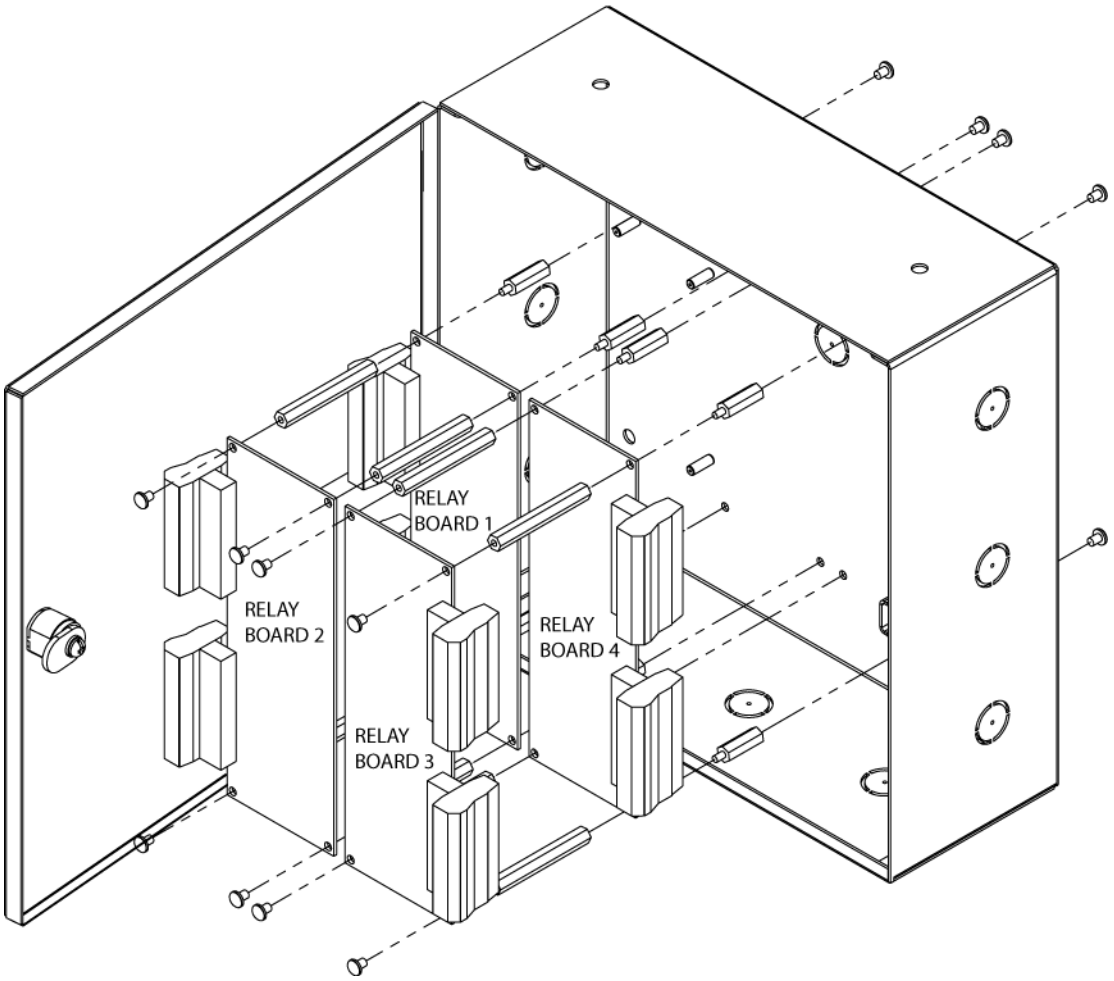

Figure 5

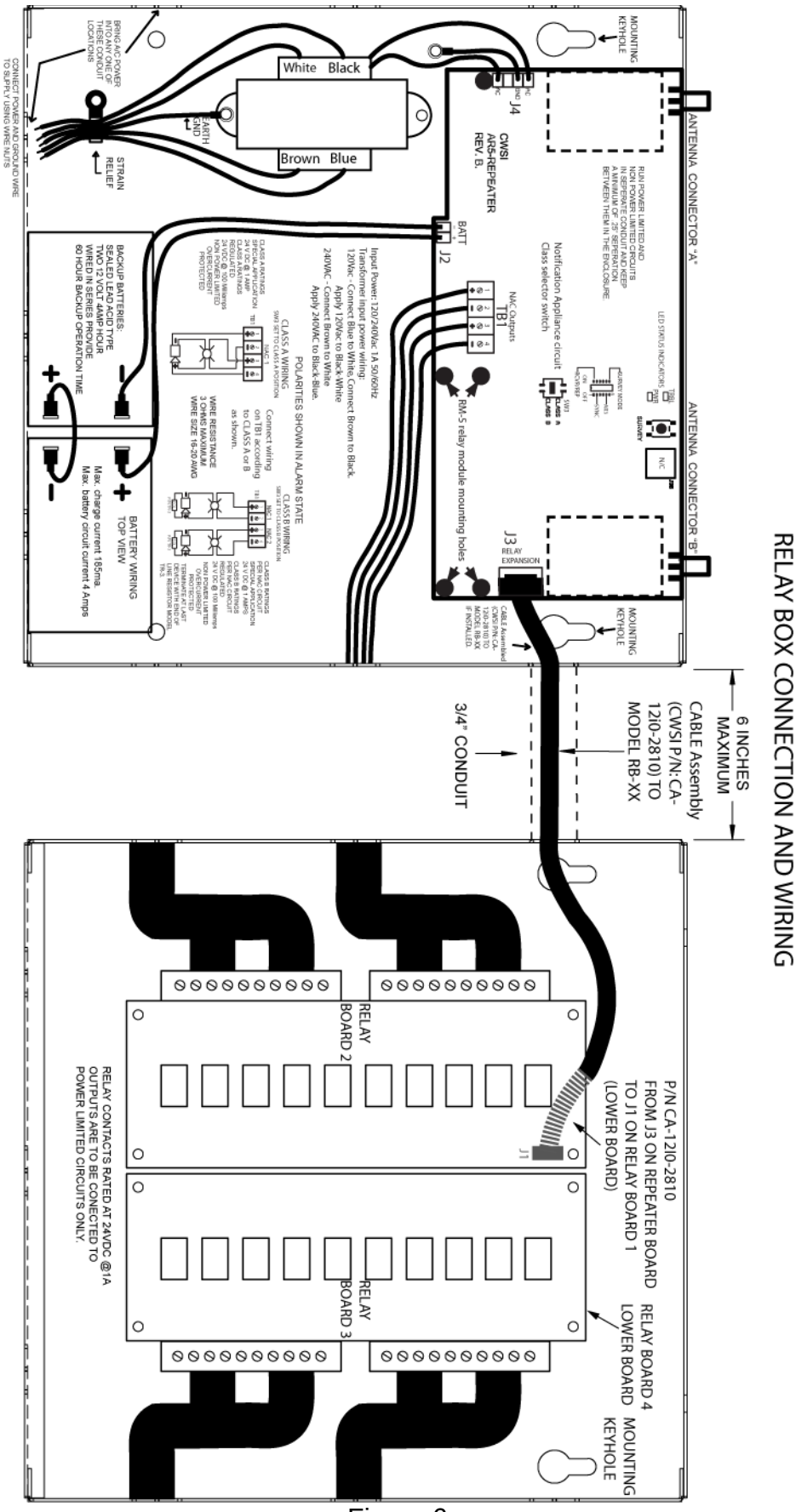

Figure 6

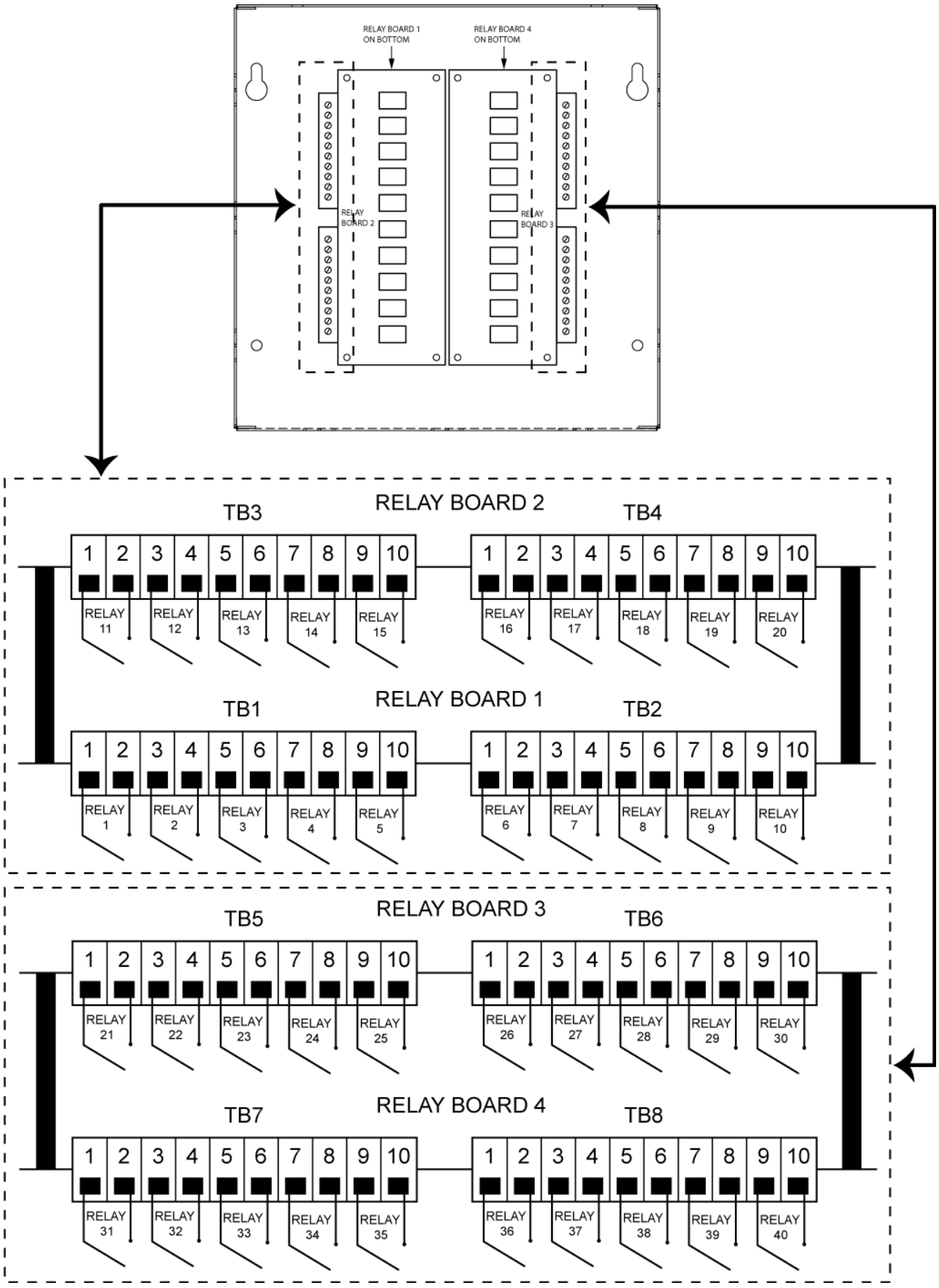

Figure 7

Section 6 – RM-5 Relay Module

6.1 Description

The RM-5 relay module is an optional sub assembly for adding 5 form C relay outputs directly to the AR-5 board. The 5 relays and terminal connections are located on a pc board which plugs into the AR-5. The outputs are then available inside of the AR-5 enclosure. The outputs are rated 30Vdc 5A.

6.2 Installation

Warning: Make sure the AR-5 repeater is powered off prior to installing the RM-5 sub assembly. The RM-5 board is snapped into the AR-5 board with standoffs and held in position with two supplied 6-32 machine screws. Position the RM-5 over the lower right side of the AR-5 board so the connector J1 on the bottom of the RM-5 board is aligned with the J3 relay expansion connector on the AR-5. Holding the RM-5 board, firmly push the nylon standoffs on the RM-5 into the two lower holes on the AR-5 until they snap in. After seating the RM-5 board install the two 6-32 screws into the upper two holes and tighten them. Do not over tighten. Refer to figure 8.

6.2.1 Wiring

Refer to figure 9 for wire routing. Follow all NFPA and local electrical codes when wiring this product. Acceptable wire size is 16-22 awg. The RM-5 board is silkscreened with the connections for the terminal block with each relay number and NC COM NO designations. The relay outputs are for connection to power limited circuits only. Relay contacts are rated at 30Vdc 5A resistive.

6.2.2 Programming

Many programming options are available for the RM-5 relay board. Since relay activation and deactivation is programmed at the CP-3600(+) control panel, please refer to that manual for programming options and instructions.

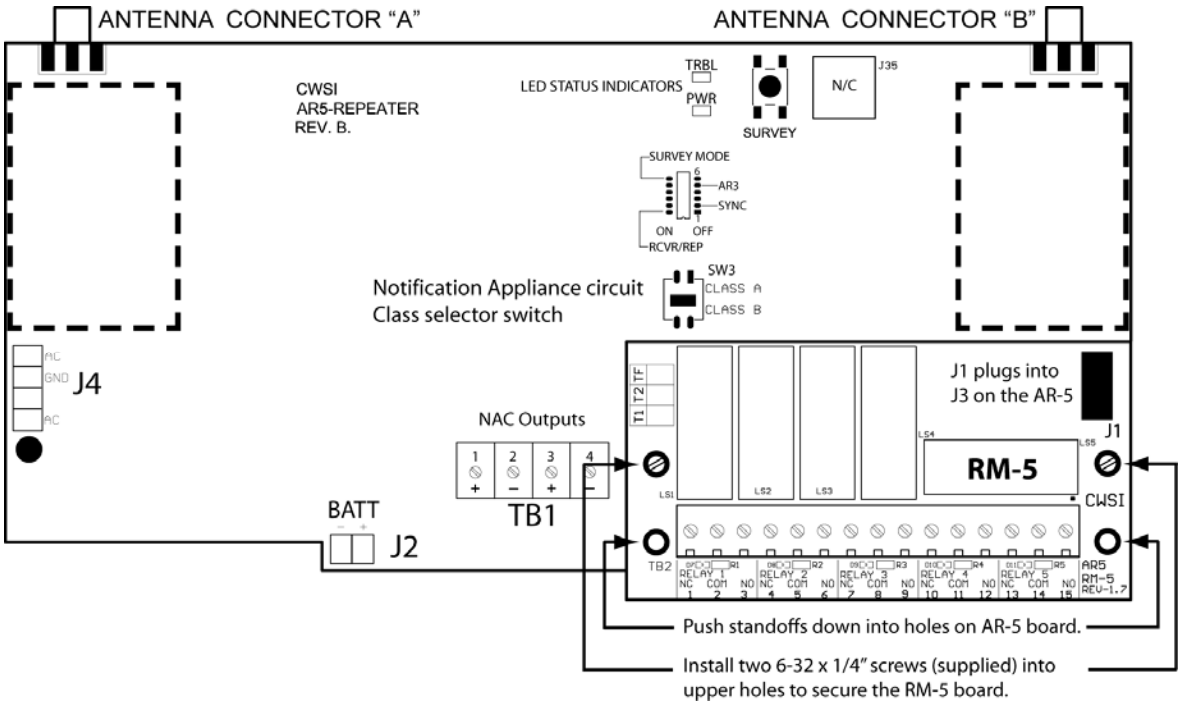

Figure 8

Section 7 – Signal Survey

7.1 New Installation Survey

This survey method is to determine acceptable locations for devices and repeaters prior to installing the equipment. It will also determine the quantity of repeaters required in the installation. You will need a minimum of one Model AR-5 repeater and one Model 345(TS) Fire transmitter to conduct the survey. The Model 345(TS) transmitter will serve as a repeater when conducting repeater to repeater signal tests. If the installation requires smoke detectors you will need one to conduct the survey. A magnet will also be required to activate the signal survey routine in the transmitters.

Begin by locating the dip switch SW2 on the repeater board. Refer to figure 3 for the switch location. Set dip switch #1 of SW2 to the right or off position. Switch #6 should be on or to the left. . Attach one of the compatible antennas to connector A then connect the batteries to the repeater. Refer to figure 3 in this manual for correct wiring. The repeater is now waiting to receive a survey transmission from any transmitter.

Begin by holding the repeater in the intended location of the CP-3600(+) facp. The first step is to survey the reception area of the control panel and which devices can report directly to it without a repeater. Use the type of transmitter that will be mounted in the location being tested. Install a battery in the transmitter to be tested and a single beep should be emitted from the transmitters sounder followed by two beeps indicating it has established communication with the repeater. The two beep confirmation signal must be heard before the survey can be conducted. If the single beep is heard but the two beeps are not, momentarily place a magnet next to the appropriate survey location of the transmitter being used. Once the initial beep is heard the magnet can be removed while waiting for the confirmation signal. Continue this until the one beep and two beep confirmation tones are both heard. Refer to the device manual to locate the magnet survey location of each transmitter. Once repeater device communication has been established the survey can begin.

Hold the device in the desired mounting location and initiate the survey signal test with the magnet held to the appropriate location on the device under test. The start of the survey is indicated by a single beep at the device and repeater. The end of the survey is indicated by either a single beep or two beeps at the device only. A single beep is the indication of an unacceptable survey and two beeps indicates a successful survey. A minimum of 5 consecutive successful surveys with the device held in the mounting location must be accomplished to validate the location as acceptable for mounting the device. If an unacceptable survey is the result then communications between the repeater and device being tested will have to be reestablished as described above to continue with the survey. Continue the survey until the range of the CP-3600(+) location is established.

Once the device locations exceed the range of the CP-3600(+) a repeater location will have to be determined to extend the installation to receive devices located outside the reception range of the CP-3600(+). To test repeater to repeater communications use the repeater along with a Model 345(TS) Fire transmitter. The Fire Transmitter must be used to simulate the second repeater. Do not use any other transmitter for repeater to repeater testing. Choose a desired location for the first repeater. Hold the Fire Transmitter at the desired repeater location and test for a good survey as described above. A good survey must be established at this location before it can be used to locate a repeater and continue the survey. Once an acceptable location has been determined, hold the repeater at this location and continue to test devices for locations that result in acceptable surveys. When the range of this repeater has been exhausted, continue to test and add repeater locations as described until a good survey result is achieved for all the devices in the installation.

7.2 Existing Installation Survey

To check the signal of an existing device in an installation, momentarily place a magnet in the appropriate survey location of the device. Refer to the device manual for the survey location of each type of transmitter. One beep should be heard at the device and the repeater which received the survey signal followed by either a single beep or two beeps at the device only. A single beep indicates an unacceptable survey and two beeps indicate an acceptable survey. If an unacceptable survey is the result, the device will have to be relocated or a repeater added to receive it at this location. To test repeater to repeater communications, press the survey button located on the repeater circuit board for 1 second then release. Refer to figure 3 for the survey button location. The beeps that indicate the survey start and result are the same as a device. The repeater which received the survey signal will beep once. This is to notify the installer which repeater is responding to the device survey signal. A minimum of 5 consecutive successful surveys with the repeater held in the mounting location must be accomplished to validate the location as acceptable for mounting the device.

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