

XTBR Mode Programmable Options

11-15-09 Initial Release

The XTBR is the enhanced repeater version of the XTB. Both units will boost the output of a X10 transmitter plugged into its X10 Input receptacle. The XTBR adds the ability to repeat commands received over the powerline. It has evolved from its big brother, the XTB-IIR, and it includes many of the mode options available on that unit. While the default configuration should work fine for most people, the mode options allow the XTBR to be customized as necessary for best performance in each installation.

Programming the Mode Options in the XTBR requires a sequence of X10 commands to be sent using a Maxi Controller plugged into its X10 Input receptacle. Each key should be pressed for about a second, and the gap between each key press must be less than 4 seconds. Mode commands should be sent on the "P" housecode. All programming begins with the key sequence 9-8-2 on the selected housecode, followed by the **single key** for the parameter to change, and then either ON or OFF. For example, the key sequence 9-8-2-14-ON enables transmit on all 3-phases. The LED will flash for about a second after the last key is released if the command is accepted. The mode number, and its status ON or OFF are transmitted over the powerline so the entry can be logged. The LED will flash 5 times if an incorrect key sequence is entered or too much time elapsed between key presses.

It may be possible to get the XTBR into a mode where it will not recognize mode commands in a high noise environment. Should this ever happen to you, the XTBR can be reset to the default configuration by pressing the ALL OFF key on a Mini or Maxi Controller connected to the X10 Input receptacle while the XTBR is plugged in after being unplugged for at least 5 seconds. The ALL OFF key should be held for about 1 second after the LED illuminates. The LED will flash again after the key is released if the default reset is accepted.

Normally the XTBR transmits "P Status ON" when power is applied, and the LED will flash briefly.

The user programmable options are as follows (default settings are in parentheses):

- 16 (on) Repeater Enable
- 15 (off) Real-Time Boost Enable
- 14 (off) 3-Phase Transmit Enable
- 13 (off) Delay Transmit Burst to prevent dimmer flicker
- 12 (Not used)
- 11 (off) Auto Retransmit of repeat following collision
- 10 (off) Abort Transmission on Collision
- 9 (on) Smart Bright/Dim Repeat for sequential commands
- 8 (off) Only One Repeat for each command to prevent repeater ping-pong
- 7 (off) High Command Storm Threshold 40/min. (OFF allows 20/min)
- 6 (on) AGC Enable (OFF for low gain fixed threshold)
- 5 (on) High AGC threshold or MSB of fixed threshold
- 4 (off) Alternate AGC window or LSB of fixed threshold
 - fixed threshold: 5-OFF 4-OFF 150 mV (min)
5-OFF 4-ON 300 mV
5-ON 4-OFF 450 mV
5-ON 4-ON 600 mV (max)
- 3 (off) Variable Decode enable
- 2 (Not used)
- 1 (Not used)

- 16 ON: **Repeater Enable** – This option enables the XTBR repeater function. Like other repeaters, this outputs a high-power transmission in bit-sync with the second half of a received command.
- 15 ON: **Real Time Boost** – This option enables the XTBR to boost each bit as it is received without any error checking. In a low noise environment, this will allow the XTBR to repeat both halves of a command. This option should not be used if there is significant powerline noise as it can cause erroneous data patterns to be transmitted.
- 14 ON: **3-Phase Transmit** – This option enables 3-phase transmit. The XTBR normally masks the superfluous 3-phase bursts to concentrate its energy into the essential zero-crossing burst. This option has been included because 3-phase transmission may still be necessary in some installations. (NOTE: The source must also be set for 3-phase transmission for this to have an effect.)
- 13 ON: **Delay Transmit Burst** (reduces the potential for dimmer flicker) – This option delays the zero-crossing transmit burst until just before the X10 reception window. Several people reported the strong signal produced by the larger XTB-IIR could induce flicker in nearby dimmers during transmissions. Delaying the transmit burst appears to reduce or eliminate this effect. While dimmer flicker may not be observed with the XTBR due to its slightly lower output power, this option is included just in case. It should only be used if dimmer flicker becomes a problem.
- 12: Not used at this time.
- 11 ON: **Auto Retransmit** – This option enables automatic retransmit of a command that was aborted due to a collision. Auto retransmit only works with repeated commands because a collision during a normal transmission would result in that command being corrupted.
- 10 ON: **Abort Transmission on Collision** – A collision is identified by a burst appearing in the timeslot when no burst is being transmitted. When this option is selected, the XTBR will immediately cease transmission of the existing command whenever a collision is identified. This is true regardless of the source of the signal. When a command is being repeated there is an option to re-transmit that command after the line has cleared.
- 9 ON: **Smart Bright/Dim Repeat** – Bright and Dim commands deviate from normal X10 protocol because they can be strung together without gaps separating the commands. Dimmer modules interpret bright and dim commands differently, depending on how the commands are strung together. Most repeaters only transmit the second half of each bright or dim command, which can cause them to be interpreted incorrectly. With this option enabled, the XTBR will repeat every bright or dim command in a sequence after the first half of the first command. The transmission ends in sync with the last received bright or dim command so that the XTBR transmission will not conflict with another command closely following that sequence.
- 8 ON: **Only One Repeat** – When a repeater is used in an installation that has another repeater or certain two-way modules, it is possible for a command to be echoed back and forth continuously. This option prevents that ping-pong effect in those special situations. For example when this option is enabled, only A-1, A-ON will be repeated for the sequence A-1, A-ON, A-ON, A-ON. However, A-1 A-ON, A-1, A-ON will be repeated completely. Because bright and dim commands are a special case, they will all continue to be repeated if the Smart Bright/Dim Repeat option is selected. Since the ping-pong effect with 2-way modules does not involve bright or dim commands, this allows the XTBR to continue handling those commands properly while preventing the ping-pong effect with 2-way modules. This option should only be used if necessary.
- 7 ON: **High Command Storm Threshold** – The XTBR will automatically shut off its transmitter when it detects continuous X10 traffic on the powerline. The XTBR will normally pass a burst of about 120 X10 commands, or 20 per minute continuous. Choosing High Threshold increases this to a burst of over 200 commands, or 40 per minute continuous. The lower limit should be adequate for most installations.

- 6 ON: **AGC Enable** - This option turns on the Automatic Gain Control (AGC) that adjusts the decode threshold above the background noise level. This option allows the XTBR to dynamically adjust its sensitivity for best performance in a given installation. When disabled, the XTBR decodes X10 line signals with a fixed, but adjustable threshold. For particularly noisy environments, there are several fixed thresholds available.
- 5 ON: **Hi AGC Threshold** - When AGC is enabled, this increases the threshold another step. This is recommended for noisy environments when incoming X10 signals are strong. When using fixed threshold, this bit determines the most significant bit of the threshold voltage. See the table below. This option is on by default to provide the best rejection against possible noise from compact fluorescent bulbs. This can be turned off if you have a relatively noise-free environment.
- 4 ON: **Alternate AGC window** - It was found that the X10 RR501 RF transceiver occasionally does not transmit its third burst in the defined slot. It falls into the beginning of the Insteon window, which is where background noise is normally sampled to set the AGC threshold level. This option allows an alternate sampling slot to avoid this problem. The alternate slot may not be quite a good sampling point, but should be tried when having difficulty receiving signals from either a RR501 or TM751 transceiver. Other units may also exhibit this phenomenon. While using fixed threshold, this bit determines the least significant bit of the threshold voltage:

fixed threshold: 5-OFF 4-OFF 150 mV (min) – use AGC for max sensitivity
5-OFF 4-ON 300 mV
5-ON 4-OFF 450 mV
5-ON 4-ON 600 mV (max)

- 3 ON: **Variable Decode** – This option selects a variable decode rather than the X10 standard 48-cycle fixed count to decode a logic one. The variable decode monitors the background noise level for a logic zero, and decodes a logic one when there is a significant increase in cycle count above the average. This option is particularly useful when trying to recover low-level X10 signals just above the noise level.

- 2: Not used at this time.
1: Not used at this time.