



## **The *Leatherwood*® CAMPUTER™ Automatic Ranging and Trajectory Scope**



### **M1200-XLR**

## **INSTRUCTIONS AND CAM SETTING CHARTS**

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**THANK YOU** for choosing the redesigned Leatherwood ART M1200-XLR riflescope. In addition to being among the finest riflescopes in the world, the M1200-XLR embodies versatility with its innovative design. While this scope's core concept is based on the original Automatic Ranging & Trajectory (ART) riflescopes developed in 1963 by Jim Leatherwood for Vietnam War era military snipers, new features and improvements make this latest version far more advanced, far more precise, and far more versatile.

This 6-24x50mm ART M1200-XLR scope has been engineered specifically for the Xtreme Long Range (XLR) shooter and hunter – who need to quickly and accurately place shots of 1000 meters or longer.

Thanks to a larger and completely re-engineered CAMputer system, which can be calibrated for a wider range of calibers, cartridges and loads, shooting different weight bullets at different velocities, the M1200 ART-XLR can now be used with a very high percentage of today's center-fire rifles – chambered for cartridges from as small as the .223 Remington up to the hard hitting .50 BMG. As long as the shooter knows the bullet ballistic coefficient and the muzzle velocity, this scope can be calibrated for more than 75-percent of today's most widely used calibers and rifles to automatically keep hits in the kill zone from 300 to 1,200 meters – or within the capability of the bullet and load.

To use, all the shooter has to do is zoom in on a target of known size until it fits inside the brackets of the ranging reticle...steady the aim...and take the shot. The CAMputer system automatically compensates for both bullet trajectory and range. You don't even have to know the range – but the reticle includes a ranging scale for those who want to know.

The M1200-XLR features a bigger and brighter 30mm tube, and a sturdier, recoil-proof mount that offers additional external windage adjustment. Precise target style windage and elevation adjustment turrets move bullet impact ¼-inch at 100 yards with each click, while the handy side focus parallax adjustment keeps the target clear and sharp at the longer ranges. Additionally, the M1200-XLR sports an illuminated (available in red or green) etched glass reticle.

Other features include a Fast Focus eye-piece for quick adjustments to eye sight, Tri-Center coil spring tension on the erector tube for positive click adjustment, and a tough PermaCoat finish that makes the scope resistant to scuffs and normal wear. All lenses are fully multi-coated with our proprietary DiamondTuff14 coating for optimum light transmission. The Leatherwood CAMPUTER™ scope system is the most advanced ART (Automatic Ranging

& Trajectory) system. This ART System is in worldwide use and its history exemplifies our commitment to building only the best rifle scopes.

## **A BRIEF HISTORY OF THE ART SCOPE TECHNOLOGY**

The ART scope technology was born out of necessity in the early years of the Vietnam War. Enemy snipers were killing American servicemen, but the US Army was not equipped to deal with the problem. The solution was to place newly trained snipers into battlefield service as soon as possible. Sniper training at that time was a long term process that required long hours on the range, teaching recruits to estimate distance and to use the proper amount of “hold-over” (aiming high to compensate for bullet drop) in order to make successful first round hits.

About this time, 2<sup>nd</sup> Lieutenant James M. Leatherwood entered the Army, and brought with him his recently patented design for a ranging scope that would raise and lower the rear of the scope similar to an open sight. Moving rapidly, the Army soon had Leatherwood System scopes in the hands of Army snipers. The use of the new scope system had dramatic effects. It was now possible to rapidly train snipers to get first round hits out to 900 meters without having to devote precious time on distance estimation or mental “hold-over” calculations. Soon, American snipers were dominating the field in Vietnam, and the ART scope system became a legend.

Since the Vietnam War era, the ART scope system steadily improved under the discerning control of the original inventor, James Leatherwood. An unrelenting insistence on durability and quality resulted in the acceptance of the ART II scope as a standard issue item by the US Army. That was followed by a civilian and law enforcement version, the ART/MPC. The modern ART scopes, based on the technology pioneered in the MPC, bring a new dimension to long range shooting.

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# SECTION 1: SPECIFICATIONS AND BASIC DEFINITIONS

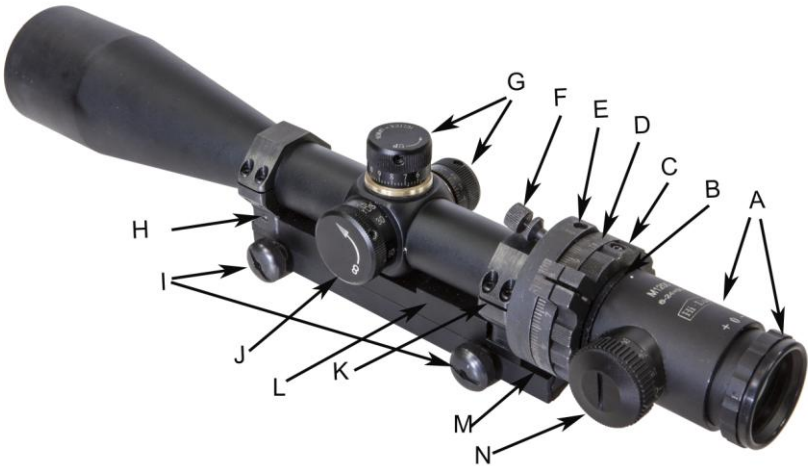
## (1) SPECIFICATIONS:

| Model     | Power | Obj. (mm) | F.O.V. @ 100 Yds (Feet) | Eye Relief (Inch) | Length (Inch) | Weight (O.Z.) | Exit Pupil Range In Variable (mm) | Tube (mm) |
|-----------|-------|-----------|-------------------------|-------------------|---------------|---------------|-----------------------------------|-----------|
| M1200-XLR | 6-24  | 50        | 12-4                    | 3.75"             | 15.5          | 32            | 8.5-2                             | 30mm      |

### Remarks:

All air-glass surfaces are fully multi-coated using our proprietary DiamondTuff14 coating to maximize the light transmission. The click adjustments for both elevation and windage are 1/4 MOA. The scope has side parallax and quick eyepiece focus adjustments with a XLR long range illuminated etched glass reticle.

## (2) BASIC DEFINITIONS AND ADJUSTMENTS:



### (A) Eyepiece:

The eyepiece is at the rear of the scope, which uses a fast focus dial. By turning the fast focus eyepiece either clockwise or counter-clockwise, you can adjust the scope's focus to suit your individual eyesight. There is a diopter scale on the eyepiece. The rheostat is also located on the eyepiece.

### (B) Power Ring:

The power ring is located in front of the eyepiece. The power ring is underneath the range ring. A series of numbers 6X to 24X on the range face are used to designate the magnification power. The power that lines up with the triangle on the Eyepiece (A) indicates the magnification at which the scope is set.

### **(C) Range Ring:**

The range ring encases the power ring and has a scallop-shaped, knurled outside face. The range numbers are marked on the inside face. The distance that lines up with the triangle on the eyepiece (A) indicates the range when the scope is used in the Auto-Range mode. The range ring has a slotted screw on the top side. By loosening the screw, the range ring can be moved back to disconnect the two locking pins. This will allow you to set the Calibration Ring (D) for a specific caliber and bullet.

### **(D) Calibration Ring:**

The calibration ring (D) is located in between the range ring (C) and the Trajectory CAM (E). There is a numerical reference scale on the outer face for calibrating the base to the ballistics of a specific ammunition combination. The numbers are marked from 3 to 12 and each increment corresponds to 0.1. The arrow on the Trajectory CAM is only used to indicate the current calibration setting. To calculate the current calibration code, multiply the reading indicated by the arrow on the calibration ring by 100. The CAM settings can be changed by loosening the screw on the calibration ring (D) while the range ring is disconnected. Please refer to Section 6 to find the correct calibration code for your bullet.

### **(E) Trajectory CAM:**

The Trajectory CAM (E) is directly in front of the calibration ring. The CAM's shape is not perfectly circular; its precise shape results from years of field testing, mathematical and trigonometric calculations and CNC machining. It is engaged to the calibration ring by the slotted head locking screw on Calibration Ring (D). The Calibration Ring clamps onto the Trajectory CAM. The Trajectory CAM ring (E) has a small arrow engraved on its outer face that is used as an index point for setting the calibration ammunition code. The Trajectory CAM sits on top of a CAM roller on the base so that the shooter can turn the Trajectory CAM easier.

**Warning: Never loosen the screw on the Trajectory CAM (E). It is a guide screw that is set in a groove to prevent the CAM from coming out. You may need to check and tighten the screw from time to time.**

### **(F) CAM Locking Screw:**

The CAM locking screw (F) is located in front of the Trajectory CAM (E) at a 45° angle. It is used to lock the CAM when you want to shoot at the desired range at manual mode.

### **(G) Elevation and Windage Adjustments:**

As displayed in the picture to the right, we have used tall, finger adjustable tactical turrets. After zeroing the scope, you can loosen the 3 screws on the turret to re-index the turret scale to 0. We also include a screw-on turret cap to keep out moisture and dirt and prevent accidental adjustment. The elevation turret **(1)** adjusts for up & down, and the windage turret **(2)** adjusts for left & right as the direction marked on the turret. **(3)** is the side focus parallax to adjust clarity of the image. Each click adjustment on both elevation and windage is 1/4 minute of angle (MOA) at 100 yard  $\approx$  1/4 inch at 100 yard  $\approx$  7mm at 100 meters. The total adjustments for both elevation and windage of this scope is 60 MOA (Minutes of Angle).



#### **(H) External Windage Adjustment on the Front Ring:**

On the front ring, there is an additional **External Windage** adjustment. If you cannot zero the rifle with the internal scope windage adjustment, you can use this external adjustment to maximize the scope's internal elevation adjustment. There is at least 35 MOA external windage adjustment on each side.

\*Note: You don't need to loosen the 8 screws on top of the rings when you do the external windage adjustment. **Please remember that if you need to move your point of impact to the left, then you need to move the external adjustment to the right, and if you need to move your point of impact to the right, then you have to move the external adjustment to the left.**

#### **(I) Slotted Head Mount Locking Thumbnuts:**

There are two slotted head mount locking thumbnuts on the mount to secure mount on bases. You can apply 35 inch-pound of torque for each thumbnut.

#### **(J) Side Focus Parallax Adjustment Knob**

The side parallax adjustment knob allows for parallax correction at various user-select ranges from 25 yards or less, up to infinity. To be parallax free, the target must be located at the distance for which the scope is focused. A target at any other distance will cause parallax. Parallax manifests itself as apparent movement of the reticle against a stationary target. The Leatherwood/Hi-Lux Side Parallax Adjustment is easily accessible.

#### **(K) Scope Ring:**

There are two scope rings to hold the scope on the cradle. Never loosen or remove the scope rings. The mount and rings are part of the ART scope system. However, we provide a T-10 star wrench in the scope package in case you need to remove the scope from mounting system.

- (1) When the external windage adjustment needs to be adjusted, loosen the two large Allen screws under the front and rear rings.
- (2) Next, loosen one set screw and push the other set screw to the left or right as needed for the adjustment.
- (3) Tighten the two small set-screws in the front mount and re-tighten the two larger Allen screws under both front and rear rings and make sure the front and rear rings are parallel.

**(L) Mount Cradle:**

The mount cradle is carefully designed to allow the Trajectory CAM to move the scope in a vertical plane. The scope may be rotated slightly within the rings to plumb the crosshairs with the rifle. The mount only allows limited rotation to prevent changing the Trajectory CAM's relationship to the CAM roller. The mount also has built in external windage adjustment as referenced by

**(M) CAM Follower Roller:**

The Trajectory CAM is sitting on top of the CAM Roller to make the CAM rotate smoothly. This 'standard' roller is pre-installed at the factory.

**(N) Rheostat Adjustment:**

The rheostat on the eyepiece has 11 settings for varying the brightness of the reticle illumination. For the best results in a low light situation, we recommend that you set the brightness to the lowest setting possible while maintaining a clear view of the reticle. The "Nv1, Nv2, and Nv3" positions are designated for use with night vision. Settings 4 and 5 are for low-light illumination. The settings from 6 to 9 are the intermediate brightness settings. The Max position is the brightest setting. There are two "Off" positions that are located at 0° and 180° positions. There is a protruded rib on the rheostat at the main "0" off position. This is to make it easier to locate the main off position in the dark. The rheostat is located at 45° left on the top of the eyepiece. The battery, which is included with the scope, is a coin style CR2032 3V lithium battery. The battery can be replaced by first removing the battery compartment cover located in the top of the rheostat adjustment, then remove the old battery, insert a new battery with "+" side facing up and retighten the cover .

## **SECTION 2: THE COMPUTER™ RANGING SYSTEM**



The combination of the power ring, range ring, calibration ring, and the Trajectory CAM ring is the mechanism that we call the **CAMPUTER™** Ranging System.

**Auto-Range™ mode** is active when all rings are locked up together, which will turn all the rings simultaneously as one unit. This allows the CAM system to automatically compensate for bullet Trajectory, and occurs when:

- (1) The two pins on the calibration ring are connected with range ring,
- (2) The locking screws on the range ring, and
- (3) The locking screws on the calibration ring are tightened down

In the **Auto-Range™ Mode**, the scope will automatically compensate for bullet drop within the ranging capacity, which is from 300 to 1200 meters. The XLR ranging reticle is designed to frame and range a known sized target. In sections 5 and 10, we will discuss more about how to use the XLR™ ranging reticle.

**Manual Mode** allows the shooter to use the variable power (zoom) of the M1200 without engaging the Trajectory CAM. Therefore there is no automatic compensation for the bullet's Trajectory. To use **Manual Mode**:

- (1) Loosen the locking screw on the range ring with several turns,
- (2) And pull back the range ring to disconnect the two pins of the calibration ring from the range ring. This will separate the Trajectory CAM ring from the power ring.

In **Manual Mode**, the power & range ring will turn independently from the Calibration & Trajectory CAM ring. Therefore, the scope will not Auto-Range in this mode, and will not automatically compensate for bullet drop. This allows the scope to set at any distance with the CAM and at any magnification you want to go. Under **Manual mode** the ART scope system can be used as a regular conventional scope.

In **Manual mode**, the bottom set of the numbers on the face of Range Ring (C), which is from 6 to 24 are still used to denote the power setting, however the range numbers 300 to 1200 that are listed just above the corresponding power settings are moot since the Range Ring is disengaged from the Calibration and Trajectory Ring.

Since the calibration ring now operates independently from the power ring, you will need to set your range manually. Using the numerical scale on top of the calibration ring multiplied by 100, you can manually set the range from 300-1200 meters by lining it up with the triangle.

### **Why Use Manual Mode?**

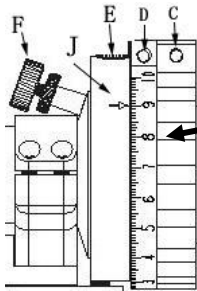
Using Manual Mode gives you the flexibility to select the combinations of magnification and range that best fit your needs. For example, you may want to set the power at 24X at a range of 300 meters for more magnification to shoot at a small target. Or, perhaps, you may want to select a setting of 7X and 500 meters for a general, all-purpose setting that will allow you to take advantage of any fast moving target when there is not enough time to "Auto-Range" the scope. When the desired range has been selected, the CAM locking screw may be tightened down to retain it in place.

## **SECTION 3: SETTING THE CAM CODE FOR YOUR AMMUNITION**

When you have determined the type of ammunition that you want to use, do the following:

- A. For the M1200 scope system, refer to the Cartridge Chart In Section 7 to determine the CAM AMMUNITION CODE.
- B. Loosen the locking screw on the Range Ring (C) and pull the Range Ring back to the rear approximately 1/8 of an inch.
- C. Loosen the locking screw slightly on the Calibration Ring (D) and free of the Calibration Ring from the Trajectory CAM (E).
- D. Find the position on the Calibration Ring (D) that corresponds with your ammo's code number. Rotate the Calibration Ring until the small arrow on the Trajectory CAM (E) is in line with the code number's position on the calibration ring.
- E. When the arrow on the Trajectory CAM (J) is pointing at the correct ammo's code number on the Calibration Ring, re-tighten the locking screw on the Calibration Ring.
- F. Push the Range Ring back to connect the two pins on the calibration ring firmly, and tighten the slotted head screw on the range ring.
- G. The scope has now been calibrated for the particular cartridge that you desire to use. If you wish to change cartridges, bullet weights, bullet style or manufacturer, simply consult the CAM Calibration Chart for the new code number, and reset the Calibration ring as directed above for the new ammunition.

- H. **Please do not loosen the screw on the Trajectory CAM (E). This is a guide screw.** You need to check and make sure this screw is tightened properly all the time.



### **Setting the Ballistic CAM**

Using the Drop Charts in SECTION 7, compare the bullet path of your load to the CAM setting drop data using information from sources, such as:

1. Ammunition manufacturers' printed materials and websites.
2. Reloading manuals, software or trajectory calculating websites such as Sierra, RCBS, Barnes, Hornady, A-Square, Speer, or Nosler.

### **Setting the Trajectory CAM once you've determined your custom / unlisted load's CAM Setting:**

- (1) Loosen the locking screw on Range Ring (C) and the locking screw on Calibration Ring (D) and pull Range Ring (C) to the rear.
- (2) Rotate the Calibration Ring (D) until the indicating arrow on the Trajectory CAM (E) points to the desired CAM setting number between 3 and 12. Most commonly used CAM settings are from 300 to 750.
- (3) After you get the correct CAM setting lined up, retighten the locking screw on the Calibration Ring (D), re-engage the locking pins on the Calibration Ring (D) back into Range Ring (C) and retighten the locking screw on the Range Ring (C). Now the CAM is set for your cartridge.
- (4) Please do not loosen the guide screw on the Trajectory CAM (E). This guide screw is set in a groove that will prevent the CAM

coming out. **You need to check this screw periodically and make sure this screw is stayed in tight all the time.**

This scope is designed to take advantage of most ballistic efficient loads and bullets. It will work for a wide range of calibers using high ballistic coefficient bullets. **For best results, we recommend keeping muzzle velocity above 2750 f.p.s. and B.C. over .30.** There will never be a perfect match, but you should find a setting that will get you within an acceptable accuracy group for the rifle and ammunition. Also different rifles, barrel length, temperature, air density, etc., will affect the bullet trajectory path.

## **SECTION 4: MOUNTING THE SCOPE ON THE RIFLE**

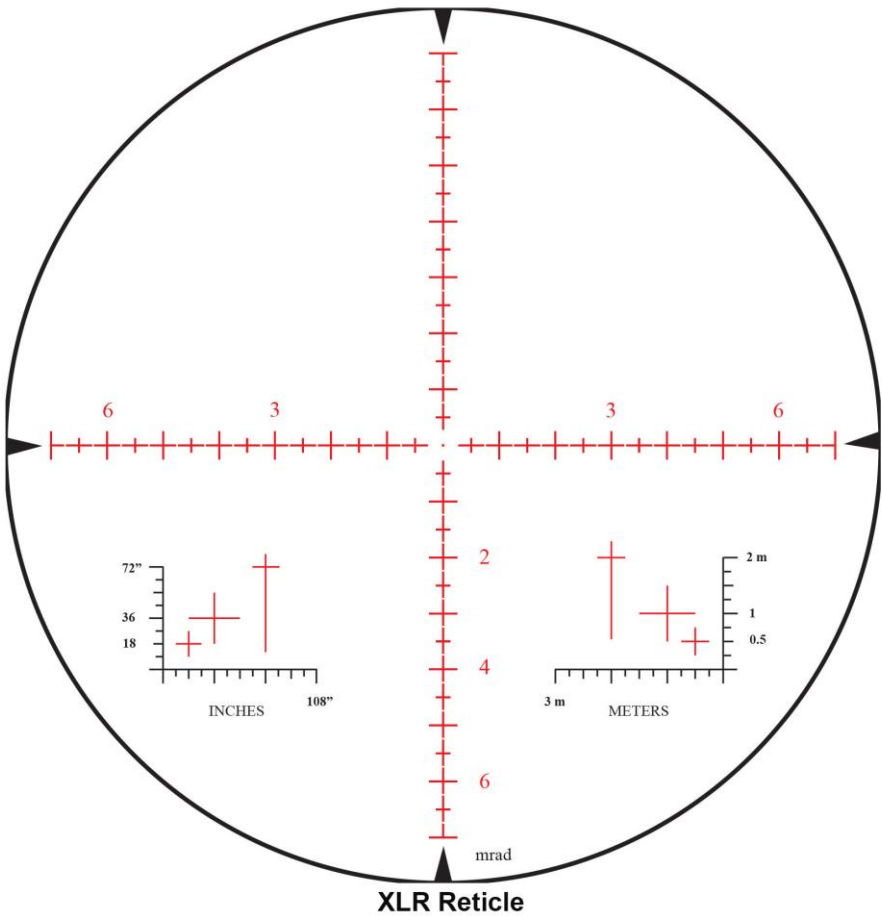
To mount the ART scope system on the rifle:

- A. Tightly secure the appropriate picatinny or weaver style base to the rifle. The ART scope mount will fit any 1913 mil-spec picatinny rail or a standard Weaver-style base. It does not require a specific spacing of slots.
- B. Loosen the two thumbnuts and clamps on the left side of the mount.
- C. Place the scope on the rifle so that the front cross-bolt is set in a corresponding groove in the base.
- D. Tighten the thumbnuts securely with finger pressure. **DO NOT USE PLIERS!** Use of pliers or other tools may deform the mount base. The maximum torque setting you may tighten the thumbnuts is 35 inch-pounds. For different rifles you may use the two wing nuts provided in the package.

## **SECTION 5: M1200-XLR RETICLE – THE LONG RANGE RANGING RETICLE**

Outfitted with red or green illumination, the M1200-XLR reticle is a glass-etched milliradian reticle. The shorter tick marks on the crosshairs are the 1/2 mil marks. The longer tick marks represent a whole milliradian. The open space between the short and long tick marks represents a 1/4 mil. The distance from the center dot to the beginning of the crosshairs is a 1/4 mil. There are two ranging scales in the reticle. The left ranging scale in the reticle is to frame a known size target in inches. The right scale is to frame known size target in meters. The three ranging crosses on the left can be used to frame targets that are: 5'9" (69 inches) tall x 19" wide, 36" x 36" and 18" x 18". The three ranging crosses on the right are used to frame targets

that are: 1.75 m tall x 0.5m wide, 1mx1m, and 0.5mx0.5m. You can use either inch or meter scale to frame any size of target by turning the power, you will get the range on your scope. Here is the layout of the M1200 XLR reticle displayed below.



## SECTION 6: M1200-XLR CHART OF TRAJECTORY PATHS FOR CAM SETTING

### Drop In MOA

| Range (m)<br>CAM Setting | 300 (m) | 400 (m) | 500 (m) | 600 (m) | 700 (m) | 800 (m) | 900 (m) | 1000 (m) | 1100 (m) | 1200 (m) |
|--------------------------|---------|---------|---------|---------|---------|---------|---------|----------|----------|----------|
| 300                      | 0       | 3.5     | 9       | 15      | 23      | 32      | 43.5    | 53.5     | N/A      | N/A      |
| 310                      | 0       | 3.5     | 9       | 15      | 22      | 31      | 42.5    | 52.5     | 62       | N/A      |
| 320                      | 0       | 3       | 8.5     | 14.5    | 22      | 30      | 41      | 51       | 61       | N/A      |
| 330                      | 0       | 3       | 8       | 14      | 21.5    | 29.5    | 40      | 50.5     | 60       | N/A      |
| 340                      | 0       | 3       | 8       | 14      | 21      | 29      | 39      | 49.5     | 59       | N/A      |
| 350                      | 0       | 3       | 8       | 13.5    | 20      | 28      | 37      | 48.5     | 58       | N/A      |
| 360                      | 0       | 3       | 8       | 13.3    | 20      | 27.5    | 36      | 48       | 57.5     | N/A      |
| 370                      | 0       | 3       | 7.5     | 13.5    | 20      | 27      | 35.5    | 46.5     | 56.5     | N/A      |
| 380                      | 0       | 3       | 7.5     | 13      | 20      | 27      | 35      | 46       | 56       | N/A      |
| 390                      | 0       | 3       | 7.5     | 13      | 19      | 26.5    | 34      | 44       | 55       | 64       |
| 400                      | 0       | 3       | 7.5     | 13      | 19      | 26      | 33      | 43       | 54       | 63       |
| 410                      | 0       | 3       | 7       | 12.5    | 19      | 25      | 32.5    | 42       | 52.5     | 61       |
| 420                      | 0       | 3       | 7       | 12.5    | 18.5    | 24.5    | 32      | 40       | 52       | 60       |
| 430                      | 0       | 3       | 7       | 12      | 18      | 23.5    | 31      | 39       | 51       | 59       |
| 440                      | 0       | 3       | 6.5     | 12      | 17.5    | 23      | 30      | 38       | 40       | 57.5     |
| 450                      | 0       | 3       | 6.5     | 12      | 17.5    | 23      | 29.5    | 37       | 48.5     | 57       |
| 460                      | 0       | 3       | 6.5     | 11.5    | 17      | 22      | 28.5    | 36       | 47       | 56       |
| 470                      | 0       | 3       | 6       | 11      | 16      | 21.5    | 28      | 35       | 45       | 55       |
| 480                      | 0       | 2.5     | 6       | 11      | 16      | 21.5    | 27      | 34       | 43       | 53       |
| 490                      | 0       | 2.5     | 6       | 10.5    | 15.5    | 21      | 26.5    | 33       | 42       | 52       |
| 500                      | 0       | 2.5     | 5.5     | 10.5    | 15.5    | 21      | 26      | 32.5     | 41       | 51       |
| 510                      | 0       | 2.5     | 5.5     | 10      | 15      | 20      | 25.5    | 31.5     | 40       | 48.5     |
| 520                      | 0       | 2.5     | 5       | 10      | 14.5    | 19.5    | 25      | 31       | 39       | 48       |
| 530                      | 0       | 2       | 5       | 9.5     | 14      | 19      | 24      | 30       | 38       | 47       |
| 540                      | 0       | 2       | 5       | 9       | 13.5    | 18.5    | 23.5    | 29       | 36       | 44.5     |
| 550                      | 0       | 2       | 5       | 8.5     | 13.5    | 18      | 23      | 28.5     | 35       | 43.5     |
| 560                      | 0       | 2       | 5       | 8       | 13      | 17.5    | 22.5    | 28       | 34       | 42.5     |
| 570                      | 0       | 2       | 5       | 8       | 13      | 17.5    | 22.5    | 27.5     | 34       | 42       |
| 580                      | 0       | 2       | 5       | 8       | 13      | 17.5    | 22      | 27       | 33.5     | 41       |
| 590                      | 0       | 2       | 5       | 8       | 13      | 17      | 21.5    | 26.5     | 32.5     | 39       |
| 600                      | 0       | 2.5     | 5       | 8.5     | 13      | 17      | 21      | 26.5     | 32       | 38.5     |
| 610                      | 0       | 2.5     | 5       | 8       | 13      | 17      | 21      | 26       | 32       | 38       |
| 620                      | 0       | 2.5     | 5       | 8       | 12      | 16.5    | 20.5    | 25       | 31       | 37       |
| 630                      | 0       | 2       | 4.5     | 7.5     | 11.5    | 16      | 19.5    | 24.5     | 30       | 36       |

## M1200-XLR Chart of Trajectory Paths for CAM Settings

### Drop In MOA

| Range (m)<br>CAM Setting | 300 (m) | 400 (m) | 500 (m) | 600 (m) | 700 (m) | 800 (m) | 900 (m) | 1000 (m) | 1100 (m) | 1200 (m) |
|--------------------------|---------|---------|---------|---------|---------|---------|---------|----------|----------|----------|
| 640                      | 0       | 2       | 4.5     | 7.5     | 11.5    | 15.5    | 19.5    | 24       | 29.5     | 35       |
| 650                      | 0       | 1.5     | 4.5     | 7.5     | 11.5    | 15      | 19      | 23.5     | 28.5     | 34       |
| 660                      | 0       | 1       | 4.5     | 7.5     | 11      | 15      | 19      | 23       | 28       | 33.5     |
| 670                      | 0       | 1       | 4.5     | 7.5     | 11      | 15      | 15.5    | 22.5     | 27.5     | 33       |
| 680                      | 0       | 1       | 4       | 7       | 10.5    | 14.5    | 15.5    | 22       | 26.5     | 32       |
| 690                      | 0       | 1       | 4       | 7       | 10.5    | 14.5    | 15      | 22       | 26.5     | 31.5     |
| 700                      | 0       | 1       | 5       | 8       | 11      | 14.5    | 15      | 22       | 26.5     | 31.5     |
| 710                      | 0       | 1       | 5       | 8       | 11      | 14.5    | 15      | 22       | 26.5     | 31       |
| 720                      | 0       | 1       | 5       | 7.5     | 10.5    | 14      | 14.5    | 21       | 26       | 30.5     |
| 730                      | 0       | 1       | 5       | 7.5     | 10.5    | 14      | 17      | 21       | 25       | 30       |
| 740                      | 0       | 1       | 5       | 7.5     | 10.5    | 14      | 17      | 21       | 25       | 30       |
| 750                      | 0       | 1       | 4.5     | 7       | 10      | 13      | 16.5    | 20       | 24       | 29       |

Many of our original scope settings were determined by *actual test firings*. There are so many new cartridges and loads that it would be impossible to list, much less shoot them all. However, modern software simulations do a pretty good job of predicting trajectories. As a result, we now list 46 different trajectories in our chart. The CAM setting codes are from 300 to 750 as the chart indicates following. On the calibration ring the 3 means 300, 4 means 400 and so forth (X100). These CAM settings will cover most of the popular loads.

### Remarks:

The bullet drop in the chart is in **MOA** and the range is in **meters**. The MOA drop in the chart corresponds to how much the Trajectory CAM rises for each CAM setting. The settings are determined by comparing the bullet drop paths for many calibers. You just need to compare your bullet's trajectory path with the path listed in the chart and find out the one that is the closest to yours. You can begin to zero your rifle with this initial CAM setting at 300 meters. If the point of impact is high in each range, adjust your CAM Setting higher. If your point of impact is low, move your CAM Setting lower. You can also visit our website at [www.hi-luxoptics.com](http://www.hi-luxoptics.com) to find out the CAM setting for most popular factory load.

If you handload your own ammo, you will need to know the velocity of the load out of your rifle, and you will need to know the ballistic coefficient (b.c.) of the bullet, in order to calibrate the CAM of the M1200. You can find the b.c. of the bullet on the bullet maker's website, or in their catalog. In order to have an accurate shot with the CAM system, we recommend to keep the muzzle velocity faster than 2750 f.p.s. and B.C. is greater than 0.3.

## **SECTION 7: QUICK ZEROING THE SCOPE USING A 100 YARD RANGE**

If you only have access to a 100 yard range, you can quick zero your scope at 100 yards with the short tick mark above the center dot. This approximates the 300 meter zero at the center dot.

The short tick mark above the center dot can be used as the aiming point for a 100 yd zero as it will be about 5 inches above the aiming point at 100 yards at 6x. This is the approximate impact point of most high velocity rounds at 100 yards with a 300 meter zero.

Because of the much greater drop of the bullet when shooting at the longer ranges, it will be necessary to precisely zero at 300 meters to properly coordinate the ballistic CAM to the actual bullet path. The 100 yard zero should get you a quick start and fairly close approximation to your final zero.

This reticle is based on our "No-Math Mil-Dot" reticle. Since the dots are "mil-dot" the shooter can readily determine that the dimensions of the framing bars in the center of the scope. The shooter frames the target in meter or ½ meter or ¼ meter increments. You can turn the M-1200's reticle to a true Mil-Dot system by turning the power to 20X.

## **SECTION 8: FINE TUNING THE CAMPUTER™ CAM SYSTEM TO YOUR RIFLE AND AMMUNITION**

If you are lucky enough to have a place to shoot long range, we recommend that you take the following steps to obtain optimum performance from the CAMPUTER™ system. These steps are particularly useful if you feel that the scope is not compensating for bullet drop correctly from the code you have chosen from the chart.

- A) Set the scope to Auto-Range Mode and



- B) Set up an 18" target at some distance between 300 meters and 1200 meters, or if possible, set up 18" targets at the 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200 meter locations.
- C) Range the scope in on the 18" target and fire a group of at least three shots.
- D) If the scope is not shooting exactly at the point of aim at the longer ranges, do the following:
  - 1. If you are shooting **low**, adjust the CAM setting **lower**. Loosen both of the locking screws on the calibration and range rings, turn the calibration ring clockwise to the desired lower CAM setting, and then tighten the locking screws on the calibration ring. If you want to enable Auto-Range mode, you need to line up the range ring with the calibration ring and tighten the locking screw on the range ring. Now the calibration ring and the power ring are locked up together.
  - 2. If you are shooting **high**, adjust the CAM setting **higher**. Loosen both the locking screws on the calibration and range rings, turn the calibration ring counter-clockwise to the desired higher CAM setting, and then tighten the locking screw on the calibration ring. If you want to enable Auto-Range mode, you need to line up the range ring with the calibration ring and tighten the locking screw on the range ring. Now the calibration ring, power ring, and range ring are all locked up together. These three rings will move together.

Adjusting the CAM setting lower will add more lift to the Trajectory CAM, and setting it higher will decrease the amount of lift. It should be possible to find a location at which the impact will be approximately within two **MOA** of the point of aim at all ranges.

If you have ballistic trajectory software, all you have to do is enter your load data and compute the bullet drop at 100-meter increments and compare the results to the chart. If you don't have access to a trajectory calculation program, then you can compare drop data with factory data or a hand loading guide.

## SECTION 9: ZEROING THE ART SCOPE

To zero the scope, use the following procedure:

- A. Check the scope to see that the thumbscrews on the range ring and the calibration ring are tightened and in line with each other.
- B. Turn the range ring all the way to the right so that the numbers 3 and 300 are at the top.
- C. Set up a target at 300 meters (327 yds) and zero the scope by using the center dot and the elevation and windage adjustments in the usual manner.
- D. When the rifle is shooting "dead-on" at the point of aim at 300 meters, it is properly zeroed in and ready for use.

## SECTION 10: HOW TO USE THE XLR RETICLE TO FRAME

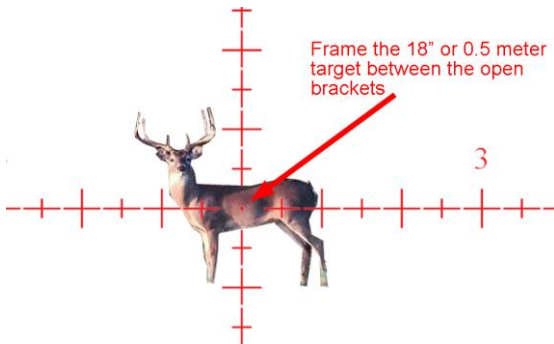
### A. The reason for framing scales

Up to this point, you have programmed the **CAMPUTER** with the correct code for the ammunition you are using. This calibrates the scope and "tells" the mechanical base how much to rise or fall to compensate for your bullet caliber. Next, you zeroed the scope, which set the crosshairs at the point of impact at a set distance. Now, in actual use, you must "tell" the scope the distance to the intended target, in order for it to properly compensate for the bullet trajectory. You do this by making use of the framing scales.

The framing scales you see in the scope allow you to overlay ("frame") a known dimension onto an equal known dimension at the target. This target's dimension can be all or part of the target. If you are shooting at a bullseye or silhouette target for example, you will generally know how high or wide that target is in inches. Likewise, if you are shooting at live game, you will want to know the useful dimensions of that animal. For example, an average sized deer has a chest "kill zone" height of about 18". Deer and antelope are about 54" tall overall. A wild pig is about 4' long from nose to tail. A coyote is about 36" long. Whatever your target is, be prepared to know or estimate one or more average dimensions of that target.

### B. Using the framing scale.

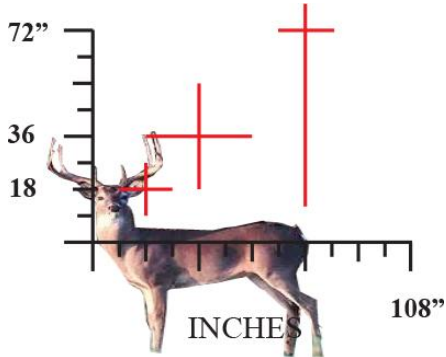
When you locate your target in the scope's field of view, you overlay the appropriate framing mark onto the target. Then, you adjust the magnification of the scope until the framing mark frames the dimension of all or part of the target. Once this is done, you have "told" the scope the distance to the target, and it has already adjusted the Trajectory. Then you put the center of the crosshairs on the intended point of impact (no need to "hold-over"), and fire. With very little practice, this procedure becomes one fluid motion...Frame, Aim and Shoot!



**Example 1:** You locate an adult buck in your scope, at an unknown distance. You know that the distance from the top of buck to the bottom of the stomach, the "kill zone," is just about 18". You frame the 18" buck torso between the open brackets in the reticle, and adjust the magnification until the

stomach fits the center open brackets. Next, simply place the center of the crosshairs on the desired point of impact, and fire.

**Example 2:** You see a 72" deer at an unknown distance. You locate it with your scope, overlay the 72" in on horizontal axis of the framing scale, and adjust magnification until the deer's approximate length corresponds to the reading on the scale. Put the center of the crosshairs on the desired point of impact, and fire.



**Example 3:** A six-inch paper bullseye is set at an unknown distance between 300 meters to 1200 meters. Locate it in your scope, overlay the ¼ meter (about 6" in the reticle) horizontal framing scale on it, and adjust the magnification until the scale approximately matches the size of the target. Center the crosshairs on the bullseye, and fire.

## **SECTION 11: LIMITED LIFETIME WARRANTY**

**Hi-Lux, Inc.** warrants its products against defects arising from faulty workmanship, or materials, for the lifetime of the original purchaser. Normal wear and tear is not covered under this warranty policy. After one year scope items may need to be serviced as part of general optic care. Such services are not warrantable. Any attempt to alter, dismantle or change the standard specifications of the products, will make this warranty null and void. This warranty is made to the original purchaser of the goods, and applies only to the products purchased in the United States. The warranty is not transferable. Warranty obligation is limited to the repair or replacement of any product returned to Hi-Lux, Inc. that is determined by the manufacturer to have defects arising from faulty workmanship or materials that adversely affect the satisfactory operation of the product. It should be noted that on items containing an etched glass reticle, which the occasional appearance of some small particles is common and not a warrantable repair. We only have a one-year warranty for the electronic components that are contained on the products. Hi-Lux, Inc. reserves the right to request proof of purchase and purchase date. To guarantee warranty service, the enclosed warranty form must be completed and returned within ten (10) days of purchase to establish all warranty rights between you, the original purchaser, and Hi-Lux, Inc. We assume no liability for any incidental or consequential damages, or incidental expenses. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusion may not apply to you. No warranties are made, or are authorized to be made, other than those expressly contained herein. To file a claim under this warranty, please contact the Customer Service Department of Hi-Lux, Inc. at (310) 257-8142 to obtain a Return Authorization number (RA number). After receiving your RA number, please mark the number on the outside of the package; enclose the defective item with a brief explanation of the problem. Please be sure to include your name, address and phone number. Failure to obtain a RA number may result in either refusal upon delivery, or lengthy delays for warranty repairs and service required for the item returned to us. All scopes are to be shipped prepaid direct to Hi-Lux, Inc. and must include a check or money order in the amount of \$21 to cover return postage and handling, regardless of purchase date. Service for discontinued items will depend on parts available for repairs. If repairs cannot be made, other options may be available. Please call for further information.

Attn.: Warranty & Service Dept.  
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3135 Kashiwa Street  
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Tel: (310) 257-8142, Fax: (310) 257-8096

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[www.hi-luxoptics.com](http://www.hi-luxoptics.com)

In the event of a non-warranty repair, you will receive an estimate prior to any work being done. This warranty gives you specific legal rights and you may have other rights, which vary from state to state. As defined by federal law, this is a limited warranty.



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