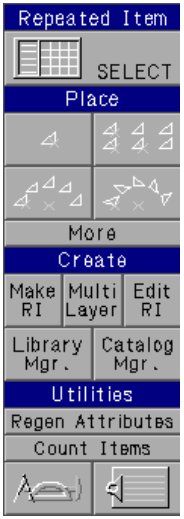
REPEATED ITEMS



A *Repeated Item* (RI) entity is a grouping of individual 2D/3D entities combined into a larger single entity. RIs can be inserted into a drawing several times over, without having to redraw the defined entities again from scratch. If it becomes necessary to edit the RI, ARRIS requires only the original RI definition to be modified and all existing RIs will be updated.

RI definitions are saved as a unique name in an external library. RIs are defined by 1 data point (*origin*) and may be rotated and/or scaled in all 3 dimensions (X,Y,Z). RIs may also contain intelligence via attributes or *node* points.

- *Attributes* are non-graphic information associated with an object. This provides a method to add useful data to any RI, and then extract it for reporting purposes.
- *Node* points allow the user to place an RI relative to an existing RI in the drawing. Using the *Place by Node* command, any *node* point in the new RI can snap to any *node* point in an existing RI. The RI's origin point is considered a *node* point. An example of this is laying out connected office panels on a floorplan.

Multi-Layer Repeated Items are similar to standard Repeated Items except they have special flags to display portions of the RI across more than 1 layer. See the discussion on Multi-Layer RIs below.

Creating a Repeated Item

There are 4 methods of creating a Repeated Item:

1. Use the *Make RI* command to fence in existing objects. This will create a new Repeated Item in the specified library as well as replace the selected existing objects with the newly created RI.
2. Use the *Edit RI* menu to edit an existing RI or draw new objects from scratch. This will only create a new Repeated Item in the specified library.
3. Use the :rim (Repeated Item Make) mnemonic command. This works very similar to the **Create RI** menu command in that you fence in existing objects to create a Repeated Item of a given name, stored in a given library. The selected existing objects are replaced by the newly created RI.
4. Use the **Create Multi-Layer RI** menu to create Multi-Layer Repeated Items.

The first three creation process are described in more detail in the Create section of this topic. Multi-Layer RI creation is described in the Multi-Layer RI section of this topic.

Repeated items may contain other RIs (of different names). This is referred to as *nesting* RIs.

Specifying an RI to Place

The appropriate RI library must be loaded prior to placing a Repeated Item. The RI library and the Repeated Item within the library may both be selected using the **Repeated Item Select** menu. See Select for more information. If the library and RI names are known, the RI library and RI name may also be specified by selecting the appropriate boxes on the RI **Status** Menu and typing the names at the prompt.

Repeated Items may also be organized in, and selected from a *Catalog*. A Repeated Item Catalog organizes the RI's in user friendly, user defined *categories* and *headings* allowing the user to find the desired RI very rapidly. The RI catalog also allows the user to select RI's which are stored in more than 1 library. See the Catalog and Repeated Item Catalog Manager topics for more information.

Repeated items may also be specified for placement using the Select Entity function. By selecting an existing Repeated Item on the screen with no other command running, then selecting Match Entity Parameters, the selected RI becomes current. It may then be placed using any of the placement commands on the **Repeated Item** Application Sub-menu. See Select Entity for more information.

Properties

PEN: The pen property is not basic to all RI objects. Each original entity within the RI will have its own pen property value. If any of the original entities within the RI were drawn with their pen property set to *none*, they will assume the current pen property value when the RI is placed.

COLOR: The color property is not basic to all RI objects. Each original entity within the RI will have its own color property value. If any of the original entities within the RI were drawn with their color property set to *none*, they will assume the current color property value when the RI is placed.

RI NAME: Each Repeated Item has a unique definition name (maximum 11 characters) within its library file.

There are 3 RI types:

- *Standard* - contains only graphic entities, no attributes.
- *Attributal* - contains graphic entities and attributes.
- *Luminaire* - contains graphic entities and photometric properties.

LIBRARY: RI libraries are files which store multiple RI definitions. This file is stored outside of the drawing, allowing it to be shared between multiple drawings. Multiple libraries (up to 128) may be loaded sequentially into a drawing, but only one is *current* at any one time. A Repeated Item library file uses the .ri extension. They are generally stored in one of 4 locations, depending on the type of Repeated Items stored inside them. ARRIS default Repeated Item libraries such as the ARRIS Repeated Item library are stored in the ARRIS program directory. Plug-In libraries such as the ARRIS Architect RI library are stored in the application. These libraries come with ARRIS and should not be altered. User created libraries should be stored in the *Standards* directory or *Project* directory. Libraries which contain office standard Repeated Items designed to be used by all projects should be stored in the *Standards* directory. Libraries which contain Repeated Items specific to a particular project should be stored in the *Project* directory. Project Repeated Item libraries may also stored inside the database directory. This is a good idea if the Repeated Items contained in the library are specific to the particular database, such as with a 3D model. In this way the RI library stays with the database if it is moved. The **Repeated Item Select** menu will search for Repeated Item libraries in the above four locations and display them for selection.

If an RI definition name is found in multiple RI libraries, then the specified RI object will be generated from the *current* RI library, If the definition name is not contained in the *current* RI library, ARRIS will look in the next most recently loaded library, and so on. If the definition is not found in any loaded libraries, ARRIS will look to the entity to determine the RI library name from which the Repeated Item was originally placed. That library will be loaded automatically if it can be found.

SCALE/SIZE: There are 3 methods to size an RI. Each method can be toggled on the **RI Status** menu by selecting the right arrow box under the Scale Heading  .

- *RI Scale Factor* is a multiplication factor of the original RI size (.5x, 2x, etc.).
- *Paper Size* is a scaling method in paper units. This determines the actual plot size of the RI.
- *Geometry Size* is a scaling method in geometry units. This determines the actual model size of the RI.

The =1 button  resets the RI scale back to its original size.

PROPORTIONAL [PROP]: Toggles *XYZ proportional* mode *on* and *off*.

- *Off* - all three methods can modify any or all of the XYZ-axes, by separating the XYZ input values with commas (X,Y,Z).
- *On* - the value specified is for the X-axis only and YZ-axes are defined proportionately.

ROTATION: Rotation can be set *absolute* to the current work plane. Angle 0 (zero) begins on the positive X-axis and increments in a counter-clockwise direction. Negative values may be specified for a clockwise rotation.

RI rotation can also be set *relative* to the current RI rotation value by rotating the graphic cursor incrementally with the square bracket keys ([=counter-clockwise and]=clockwise). The *cursor rotation increment* (ci) value determines the relative incremental rotation. The *cursor rotation increment* (ci) can be set under RI rotation on the status menu.

The =0  button resets the RI rotation back to its original rotation.

OFFSETS: Typically, RIs are inserted by their *origin* points. By temporarily defining an RI *offset* point, the RI can be placed by a new handle. Setting origin offsets does not redefine the RI's origin.

The Set button on the Repeated Item **STATUS** Menu brings up the **RI ORIGIN OFFSETS** Pop-up menu from which the X, Y, and Z Repeated Item origin offsets may be set. The CLR button on the Repeated Item **STATUS** menu clears the origin offset values to 0.

The RI offset point may also be set in the *RI Origin Offsets* and *Place Relative to Existing RI* commands (discussed later in this topic).

DRAG: Toggles cursor drag *on* and *off*. This function redefines the graphic cursor into the current RI. Turning *drag* off, may speed up the RI placement when working with complex Repeated Items.

Commands

SINGLE: This command adds a single Repeated Item to the *current* work layer. The current Repeated Item will be shown on the cursor (unless the Drag setting is *off*). **ARRIS** will prompt for the Repeated Item location point. Place the Repeated Item using the F1, F2, F3, F11 key or by entering coordinates (depending on the location desired). The Repeated Item of the current name will be placed with its origin at the point selected, using the current scale and rotation factors. This command loops so, **ARRIS** will prompt for another Repeated Item location point after the previous RI is placed. Select the point using the F10 key to exit the command.

Note 1: During the *RI location* prompt, the Repeated Item may be rotated for placement using the square bracket [and] keys. The Repeated Item (and cursor) is rotated incrementally the number of degrees set in the *cursor rotation increment* (ci) for each press of the bracket key. The *cursor rotation increment* (ci) may be set by selecting the RI Rotation box on the Repeated Item **Status** menu. The left bracket [key rotates the cursor and Repeated Item counter-clockwise, and the right bracket] key rotates the cursor and Repeated Item clockwise.

Note 2: This command is also invoked when the Place button (or highlighted Repeated Item) is selected in the **Repeated Item Select** menu.

Note 3: The following commands (discussed later) also place a single Repeated Item:

a) The *Place by Node* command.

b) The scale/rotate commands; *2 Point Fit*, *2 Point Area Fit*, and *2 Point Volume Fit.*

c) The *Place Relative to Existing RI* command.

MULTIPLE REPEATED ITEMS: This command adds a 2 dimensional array of Repeated Items to the current work layer based on the spacing and totals specified. The current Repeated Item as shown on the Repeated Item **Status** menu is placed. ARRIS first prompts for the location of the first Repeated Item. Place the RI using either the F1, F2, F3, F11 key or coordinates. The next prompt is for the next RI location in the first row. Place the second RI in a similar fashion to the first. ARRIS will then prompt for the total number of RI's in each row. ARRIS will place the remaining Repeated Items (of the same current Repeated Item name) in the row spaced the to total the number given. ARRIS will next prompt for the first repeated Item in the next row. Place this item using either the F1, F2, F3, F11 key or coordinates. ARRIS will place the entire second row using the number of items per row you have just entered. The final prompt is for the total number of rows. ARRIS will place the number of rows of Repeated Items given, each containing the number of Repeated Items per row given. This command loops so, ARRIS will prompt for another 1st Repeated Item location point after the previous RI array is placed. Select the 1st Repeated Item point using the F10 key to exit the command.

Note 1: During the *1st RI location* prompt, the Repeated Item may be rotated for placement using the square bracket [and] keys. The Repeated Item (and cursor) is rotated incrementally the number of degrees set in the *cursor rotation increment* (ci) for each press of the bracket key. The *cursor rotation increment* (ci) may be set by selecting the RI Rotation box on the Repeated Item **Status** menu. The left bracket [key rotates the cursor and Repeated Item counter-clockwise, and the right bracket] key

rotates the cursor and Repeated Item clockwise.

Note 2: The space between the first two points (p1-p2) determines the spacing of individual RIs in a row.

Note 3: The space between the first and third point (p1-p3) determines the spacing or offset between rows of RIs.

FIXED CIRCULAR ARRAY OF REPEATED ITEMS: This command adds a fixed circular array of RIs to the *current* work layer. 
The current Repeated Item as shown on the Repeated Item **Status** menu is placed. The Repeated Items are all placed at the same rotation angle as the first RI placed, either as set on the Repeated Item **Status** menu, or as rotated with the cursor using the bracket [ ] keys. ARRIS first prompts for the location of the first Repeated Item. Place the RI using either the F1, F2, F3, F11 key or coordinates. ARRIS will next prompt for the center point of the circle of RI's to be placed. The next prompt defines the placement of Repeated Items with choices of Full Circle, Angle, Arc Length, Chord Length, or Point On Arc. The remaining prompts for this command will vary depending on the choices you make for defining the placement. This command loops so, ARRIS will prompt for another 1st Repeated Item location point after the previous RI array is placed. Select the 1st Repeated Item point using the F10 key to exit the command.

Note 1: During the *1st RI location* prompt, the Repeated Item may be rotated for placement using the square bracket [and] keys. The Repeated Item (and cursor) is rotated incrementally the number of degrees set in the *cursor rotation increment* (ci) for each press of the bracket key. The *cursor rotation increment* (ci) may be set by selecting the RI Rotation box on the Repeated Item **Status** menu. The left bracket [key rotates the cursor and Repeated Item counter-clockwise, and the right bracket] key rotates the cursor and Repeated Item clockwise.

Note 2: In the *Spacing* prompt, only the *even* option will assure the placement of an RI at both ends of the *Total span of arc*. Other options in the Spacing prompt may or may not. No RI will ever be placed outside the *Total span of arc*.

RADIAL CIRCULAR ARRAY OF REPEATED ITEMS: This command adds a radial circular array of RIs to the *current* work layer. 
The current Repeated Item as shown on the Repeated Item **Status** menu is placed. The rotation of the Repeated Items placed in the circular pattern is adjusted to "face" the center of the circle, using the 1st RI placed as the baseline rotation. ARRIS first prompts for the location of the first Repeated Item. Place the RI using either the F1, F2, F3, F11 key or coordinates. ARRIS will next prompt for the center point of the circle of RI's to be placed. The next

prompt defines the placement of Repeated Items with choices of Full Circle, Angle, Arc Length, Chord Length, or Point On Arc. The remaining prompts for this command will vary depending on the choices you make for defining the placement. This command loops so, ARRIS will prompt for another 1st Repeated Item location point after the previous RI array is placed. Select the 1st Repeated Item point using the F10 key to exit the command.

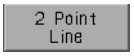
Note 1: During the *1st RI location* prompt, the Repeated Item may be rotated for placement using the square bracket [and] keys. The Repeated Item (and cursor) is rotated incrementally the number of degrees set in the *cursor rotation increment* (ci) for each press of the bracket key. The *cursor rotation increment* (ci) may be set by selecting the RI Rotation box on the Repeated Item **Status** menu. The left bracket [key rotates the cursor and Repeated Item counter-clockwise, and the right bracket] key rotates the cursor and Repeated Item clockwise.

Note 2: In the *Spacing* prompt, only the *even* option will assure the placement of an RI at both ends of the *Total span of arc*. Other options in the Spacing prompt may or may not. No RI will ever be placed outside the *Total span of arc*.

More Commands

The following Repeated Item placement commands are found on the **Place RI** pop-up menu which is reached by selecting *More* on the **Repeated Item** application sub-menu.

2 POINT LINE (FORCE FIT): This command determines the X-scale and Z rotation for the current RI based on the specified line (p1-p2) and then adds an RI to the *current* work layer.



ARRIS will prompt for two points (p1 and p2). The distance between these two points will define the scale (X direction) of the Repeated Item to be placed. The angle between the two points entered will determine the Z rotation setting for the Repeated Item to be placed. ARRIS will then prompt for the new Repeated Item location.

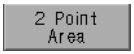
Note 1: During the *RI location* prompt, the Repeated Item may be rotated for placement using the square bracket [and] keys, overriding the rotation determined by the angle defined by the first two points entered. The Repeated Item (and cursor) is rotated incrementally the number of degrees set in the *cursor rotation increment* (ci) for each press of the bracket key. The *cursor rotation increment* (ci) may be set by selecting the RI Rotation box on the Repeated Item **Status** menu. The left bracket [key rotates the cursor and Repeated Item counter-clockwise, and the right bracket] key rotates the cursor and Repeated Item clockwise.

Note 2: The Y and Z scales are defined proportional to the X-dimension.

Note 3: If the F10 key is used for the *Position for RI location* prompt, the RI is placed at the midpoint between the first two points entered (p1 and p2).

Note 4: Also see the *2 Point Area* and *2 Point Volume* commands.

2 POINT AREA (FORCE FIT): This command determines the X and Y scale (no rotation) for the current RI based on the XY dimensions of the user defined area and then adds an RI to the *current* work layer. **ARRIS** will prompt for two points (p1 and p2). The X component distance between these two points will define the X direction scale factor of the Repeated Item to be placed. The Y component distance between the two points entered will define the Y direction scale factor of the Repeated Item to be placed. **ARRIS** will then prompt for the new Repeated Item location.

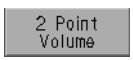


Note 1: During the *RI location* prompt, the Repeated Item may be rotated for placement using the square bracket [and] keys. The Repeated Item (and cursor) is rotated incrementally the number of degrees set in the *cursor rotation increment* (ci) for each press of the bracket key. The *cursor rotation increment* (ci) may be set by selecting the RI Rotation box on the Repeated Item **Status** menu. The left bracket [key rotates the cursor and Repeated Item counter-clockwise, and the right bracket] key rotates the cursor and Repeated Item clockwise.

Note 2: If the F10 key is used for the *Position for RI location* prompt, the RI is placed at the midpoint between the first two points entered (p1 and p2).

Note 3: Use the *2 Point Volume* command for 3D RIs.

2 POINT VOLUME (FORCE FIT): This command determines the X, Y, and Z scale for the current 3D RI based on the XYZ dimensions of the user defined volume and then adds an RI to the *current* work layer. **ARRIS** will prompt for two points (p1 and p2). The X component distance between these two points will define the X direction scale factor of the Repeated Item to be placed. The Y component distance between the two points entered will define the Y direction scale factor of the Repeated Item to be placed. The Z component distance between the two points entered will define the Z direction scale factor of the Repeated Item to be placed. **ARRIS** will then prompt for the new Repeated Item location.



Note 1: During the *RI location* prompt, the Repeated Item may be rotated for placement using the square bracket [and] keys. The Repeated Item (and cursor) is rotated incrementally the number of degrees set in the *cursor rotation increment* (ci) for each press of the bracket key. The *cursor rotation increment* (ci) may be set by selecting the RI Rotation box on the Repeated Item **Status** menu. The left bracket [key rotates the cursor and Repeated Item counter-clockwise, and the right bracket] key rotates the cursor and Repeated Item clockwise.

Note 2: If the F10 key is used for the *Position for RI location* prompt, the RI is placed at the midpoint between the first two points entered (p1 and p2).

Note 3: Use the *2 Point Area* command for 2D RIs.

ORIGIN OFFSET: This command invokes the **RI ORIGIN OFFSET** pop-up menu displaying the current RI. There are 3 buttons which define the *offset* point or *handle* point. The [RESET] buttons returns the *offset* point back to the RI origin. The other 2 buttons defines the *offset* point via:

1. *Offset* - type in any XYZ coordinate.
2. *Graphic* - select a point with either the F1, F3, or F11 keys. Do not type in XYZ coordinates from this prompt.

The RI origin offset is reset to 0 (the RI origin) at the beginning of this command.

NODE SNAP: This command adds an RI to the *current* work layer by snapping the nearest *node* point (or origin) in the new RI to an existing *node* point in an existing RI in the database. The command works very similar to the Place Single method of placing a Repeated Item. After selecting the command, with the Repeated Item shown on the cursor, move the cursor to the desired location in the drawing with a node point on the Repeated Item being placed close to a node point on an existing Repeated Item in the database. Place the Repeated Item using the F1 key. The Repeated Item location will snap the node point on the Repeated Item being placed to the closest node point of the existing Repeated Item.

Note 1: The existing RI in the database must have pre-defined *node* points. See *Edit RI* command for placing nodes in RIs.

Nodes may be defined on Repeated Items using the **Draw / Edit Repeated Item** menu. Refer to the Draw / Edit RI discussion in the Create section of this topic below. Nodes may be displayed on the existing Repeated Items in the database, and on Repeated Items in the **Repeated Item Select** menu by turning the node display on. This function is found on the **Repeated Item Tools** menu, which is displayed by selecting the Tools (T-Square, Compass, Triangle) icon at the bottom of the **Repeated Items** application sub-menu.

PLACE RELATIVE TO EXISTING RI (RELATIVE TO EXIST):

This command adds a new RI relative to an existing RI by setting RI offsets. **ARRIS** will prompt for the existing Repeated Item to use as a base location. The **Place Relative To Existing RI** pop up menu is then displayed.

This popup menu is divided into 2 columns:

1. The left column displays the existing RI's name, rotation, and *reference* point location. Only the *reference* point location can be modified.
2. The right column displays the new RI's name, *rotation*, and *handle* point. The *rotation* and the *handle* point can be modified.

There are 3 buttons in each column. The [RESET] buttons return the *reference/handle* points back to their respective RI origins. The other 2 buttons define the *reference/handle* point locations:

1. *Keyboard* [KEYBRD] - type in any XYZ coordinate.
2. *Graphically* [GRAPH] - select a point with either the F1, F3, of F11 keys. Do not type in XYZ coordinates from this prompt.

In the display window, the existing RI is displayed on the left and the new RI, on the right. Two small ghost squares will appear over both RIs representing the *reference/handle* point locations.

The *reference/handle* point locations are relative to one another, separated by the [RELATIVE LOCATION] distance. This is specified as an XYZ coordinate.

The [PLACE AS SHOWN] button clears the pop-up menu and adds the new RI relative to the existing RI.

The [EXIT - NO PLACE] button clears the pop-up menu.

Create

MAKE RI: This command defines a new Repeated Item from multiple existing objects on the *current* work layer and stores it in a library file.

The first step is to draw what will become your Repeated Item on the work layer. Repeated Items may contain any other **ARRIS** entities, such as lines, circles, text, and even other Repeated Items. While complex entities such as patterns or walls may be used within a Repeated Item, the best results are generally obtained when the Repeated Item does not contain other complex entities. To create the Repeated Item, select the RI button under the Create heading on the Repeated Item application sub-menu.

ARRIS will first prompt for the first and second point of a window (fence) which defines the extent of your Repeated Item. Select points that will completely enclose the entities you wish to include in your Repeated Item. All entities on the current work layer that are completely within the fence will be a part of the new RI.

ARRIS will then prompt for the Repeated Item *Origin* point. This is the point by which the RI will be placed and selected in the database. This is usually an existing point on an entity within the RI selected using the F3 key. The origin

point may be any point however, within or outside the collection of entities comprising the Repeated Item, and may be selected based on a logical location for when the RI is placed.

ARRIS will next prompt for the Repeated Item *Name*. Enter a unique name for the Repeated Item at the keyboard. The RI name may be comprised of alphanumeric characters (a-z, 1-0) and the underscore (_) character, and is limited to 12 characters in length. The name may not contain any spaces.

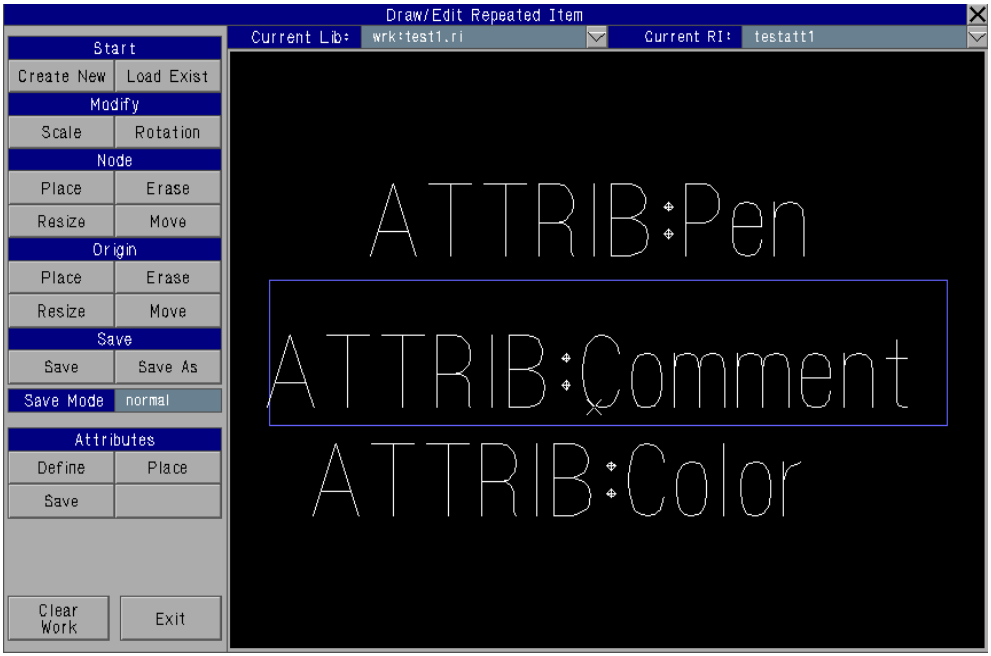
The final prompt in the RI Create process is for the Repeated Item *Library.* Enter the Repeated Item Library name at the keyboard. The current Repeated Item library is given on the prompt as the default. If an existing RI library is selected, the new Repeated Item will be added to this library. If the RI library does not exist, a new library with the given name will be created with the single new Repeated Item inside. If the Repeated Item name given exists within the specified library, the old RI definition is replaced with the new one you have just created. Be careful in naming your Repeated Items because **ARRIS** will overwrite an existing RI name in the library, changing it's definition.

Note 1: For additional options to the *1st fence point for new RI* prompt (p1), refer to special fence types in the Search Methods topic.

Note 2: The original entites drawn and included within the Repeated Item will be replaced in the database with the new Repeated Item.

MULTI-LAYER: This command brings up the **Create Multi-Layer RI** menu which allows you to set the parameters necessary for creating a Multi-Layer Repeated Item. Refer to the discussion of Multi-Layer RIs below.

EDIT RI: This command brings up the **DRAW / EDIT RI** menu which provides a temporary workspace to edit an existing Repeated Item or create a new RI. With this menu, objects can be added, edited, or deleted from an RI. In addition, the *origin* may be relocated or *nodes* can be added to facilitate snapping together RIs.



The Button functions in the **Draw / Edit Repeated Item** menu are as follows:

Start Heading

Create New - Creates a new Repeated Item in the **Draw / Edit Repeated Item** menu.

Load Existing - Loads an existing Repeated Item into the **Draw / Edit Repeated Item** menu for editing. This function places the RI at the coordinate location A(0,0,0) on a temporary work layer and freezes it into its individual entities.

Modify Heading

Scale - Scales all objects in the display window. This is a relative scale, not absolute.

Rotation - Rotates all objects in the display window. This is a relative rotation, adding the specified rotational value to the current rotation of the objects.

Node Heading

Place - Adds a *node* marker at the specified point to the objects in the display window.

Erase - Removes an existing *node* marker from the objects in the display window.

Resize - Resizes an existing *node* marker in the display window.

Move - Relocates an existing *node* marker in the display window.

Origin Heading

Place - Adds an *origin* marker at the coordinate location A(0,0,0) in the display window. This does not add a new origin, only a new marker. There is only one origin for a Repeated Item, and thus there can be only one origin marker.

Erase - Removes the existing *origin* marker from the objects in the display window. This only erases the origin marker, not the Repeated Item's origin. All Repeated Items must have an origin.

Resize - Resizes the existing *origin* marker in the display window.

Move - Relocates the existing *origin* marker for the objects in the display window, thus relocating the origin for the Repeated Item. The *origin* marker must be placed before attempting to relocate it.

Save Heading

Save - Saves the collection of the current objects in the display window as a Repeated Item using the current Repeated Item name.

Save As - Saves the collection of the current objects in the display window as a Repeated Item using a different name from the current Repeated Item.

Attributes Heading

Define - Displays the **Attribute Definition** menu. This menu displays defined *attributes* which are associated with the Repeated Item, and provides tools to Add, Delete and modify attributes. Refer to the Attributes topic for more information.

Place - Places *attributes* which are displayable in the Repeated Item. If a defined attribute is displayable, it's display location must be placed within the Repeated Item. Refer to the Attributes topic for more information.

Save - Saves attribute definition and display locations. If the Repeated Item has attributes which have been added or modified, this Save button must be used to save the *attribute* definitions before the Save button under the Save heading is used to save the Repeated Item itself.

General Commands

Current Lib: - Sets the current Repeated Item Library. Repeated Items saved

using the **Draw / Edit Repeated Item** menu will be saved to the library displayed here.

Current RI: - Sets the current Repeated Item name. Repeated Items saved using the **Draw / Edit Repeated Item** menu will be saved using the Repeated Item name displayed here.

Clear Work - Erases all graphic objects in the display window.

Exit - Removes the temporary work layer associated with the **Draw Edit Repeated Item** pop-up menu and closes the menu.

LIBRARY MANAGER: This command starts the Repeated Item Library Manager. Refer to the Repeated Item Library Manager topic for more information.

CATALOG MANAGER: This command starts the Repeated Item Catalog Manager. Refer to the Repeated Item Catalog Manager topic for more information.

Multi-Layer Repeated Items

Multi-Layer Repeated Items allow a single Repeated Item to display geometry which can be turned on and off with one or more layers. You can place geometry which you only want to see if certain layers are turned on within a single RI, and toggle the display of the geometry by turning on and off the proper layers.

Features

A Multi-Layer Repeated Item is the same as any other Repeated Item except that it contains layer information as flags for the entities contained within it. It is stored in a library and placed using the **Repeated Item Select** menu (or RI placement mnemonics), just like any other Repeated Item. It can be included in a Repeated Item Catalog. A Multi-Layer RI may be placed on any layer.

Note 1: A Multi-Layer Repeated Item is still a single entity which is placed on a single layer. When a Multi-Layer RI is created, the layer name where each entity included within the RI is drawn is stored within the RI.

Note 2: Entities in Multi-Layer RIs (and other Multi-Layer functions) will operate with a set of flags that comprise a 64 character layer name. This is the maximum length for a layer name.

Note 3: Extrema will not check for layer modes. An Unzoom will zoom to the entire Repeated Item, even if some layers to display a portion of the RI are turned off.

Note 4: Edits are performed in the placement layer only. If you delete the RI, or

move the RI, the entire RI is deleted or moved, including parts which display in layers that are turned off and are thus not currently visible.

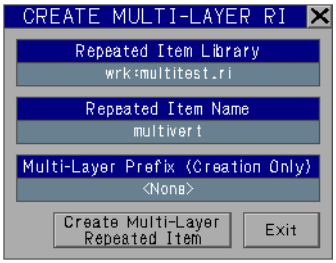
Note 5: Searches will check the display layers. If you are searching for the display list of a point such as the endpoint of a line within the RI, the point or line must be in a layer that is currently visible.

There are two basic types of Multi-Layer Repeated Items - *Fixed Layer* and *Variable Layer*. With Fixed Layer Multi-Layer RIs, the display layer names for entities within the RI are fixed to specific layer names. The entities will only display when the specific layer name is present and turned on. Relative Layer Multi-Layer RIs store a portion of the layer name at the time the RI is created and append it to a portion of the placement layer name to determine the display layer name for specific entities within the RI. More information is found in the *Variable Layer Names* discussion below.

Create A Multi-Layer Repeated Item

.Creating a Multi-Layer Repeated Item is similar to creating a standard RI. You must first draw the item. In the case of the Multi-Layer RI, the geometry to be included in the RI may be drawn across multiple layers. Geometry which is drawn in layer "0" will be included in the RI as non-Multi-Layer data.

To create the Multi-Layer Repeated Item, select the Multi-Layer button under the Create heading on the **Repeated Item** Application Sub-menu. This brings up the **Create Multi-Layer Repeated Item** pop-up menu. The parameter settings and commands on this menu are as follows:



REPEATED ITEM LIBRARY: This command allows you to set the Repeated Item Library in which the new Multi-Layer RI will be stored.

REPEATED ITEM NAME: This command allows you to set the Repeated Item Name for the new Multi-Layer RI.

MULTI-LAYER PREFIX (CREATION ONLY): This parameter is a layer group "prefix" which is used for creating Multi-Layer Repeated Items that will be placed in a Variable layer set. The prefix is the first (common) portion of the layer name for layers where geometry to be included in the RI is drawn. As the RI is created, this portion of the RI name is dropped and only the remainder (unique) portion of the display layer name is retained. When the RI is placed, the remaining portion of the layer name is appended to the placement layer "group"

portion of the layer name. This enables the RI to be placed in various groups of layers and still have the portions of the RI display on the correct specific layer for the placement group.

CREATE MULT-LAYER REPEATED ITEM: This command creates the Multi-Layer RI. The actual creation is similar to creating a normal RI using the RI Create command. The **Create Multi-Layer Repeated Item** menu will clear from the screen.

ARRIS will first prompt for the first and second point of a window (fence) which defines the extent of your Repeated Item. Select points that will completely enclose the entities you wish to include in your Repeated Item. All entities on all layers that are completely within the fence will be a part of the new RI.

ARRIS will then prompt for the Repeated Item *Origin* point. This is the point by which the RI will be placed and selected in the database. This is usually an existing point on an entity within the RI selected using the F3 key. The origin point may be any point however, within or outside the collection of entities comprising the Repeated Item, and may be selected based on a logical location for when the RI is placed.

The name of the Repeated Item created and the RI Library into which it is placed are as they are set on the **Create Multi-Layer Repeated Item** menu.

EXIT: This command clears the **Create Multi-Layer Repeated Item** menu from the screen. The Multi-Layer RI is not created.

Place a Multi-Layer Repeated Item

A Multi-Layer Repeated Item is placed using any of the placement commands or menus, just like any other Repeated Item. The RI may be placed on any layer, either a display layer for entities contained in the RI or any other layer.

1. The layer where the RI is placed must be on for display or none of the RI will display, even if other layers named on the flags for entities in the RI are on. Because of this, Multi-Layer RIs should be placed on a master layer (such as "xxx_ribase") which can remain on, giving display control to the other layers carried on the flags within the RI. Alternately the RI should be placed on a layer which is always on if the Multi-Layer features are desired.
    - Example: The RI could be placed on a "furniture" layer, and use multi-layers for labels such as part number and description. The "labels" may be turned off separately from the main "furniture" layer but the labels cannot be turned on unless the main "furniture" layer is on.
2. Once placed, the entities within the RI will display according to the layer

modes of the layer named on the flag in the entity (the layer the entity was on when the RI was created).

- Example: Say you have lines drawn on layer "one", "two", and "three", and create a Multi-Layer RI containing these lines. If the RI is placed on layer "base", then layer "base" must be on for display or none of the RI will display. Assuming layer "base" is on, the lines originally in layer "one" when the RI was created will display if layer "one" is on for display, the lines originally in layer "two" will display if layer "two" is on for display, and so on. If the layer is off, the portion of the Multi-Layer RI for that layer will not display.

3. Layer "0" (layer name "0", not layer number 0) is ignored for Multi-Layer definitions. Geometry which is on layer "0" at the time the Multi-Layer RI is created is treated as non-Multi-Layer geometry. This geometry will display with the layer in which the RI is placed, similar to a normal RI.
4. If the display layer for a portion of the Multi-Layer Repeated Item does not exist in the currently loaded drawing, that portion of the RI will not display. The layer is not automatically loaded if it exists, or automatically created if it does not exist.
5. For "order of display", the Multi-Layer RI will be displayed when its occurrence is found on the layer where the RI is actually placed. All portions of the RI are displayed at this time, regardless of the order of the display layers contained on entities within the RI.

Variable Layer Names

When a Multi-Layer Repeated Item is created, a prefix may be designated which indicates a portion of the layer name for entities within the RI that is dropped during creation of the RI. When the RI is placed, a special layer name ending in "ribase" is used for the placement layer that allows the portion of the placement layer name before "ribase" to be substituted for the prefix that was dropped during RI creation. This feature allows placement of Multi-Layer Repeated Items in different layer "groups" such as first floor, second floor, etc. using the same Repeated Item. In order to use this feature you *must* have a well designed layer standard and naming convention.

1. The layer where the RI is placed must be named using a layer "group" designation plus "ribase".
   - Example: Create a Multi-Layer Repeated Item which will display using 5 layers which are in a variable group. Assume you have the layers p01wall, p01fixt, p01poch, p01keys, and p01note. Draw the various parts of the RI in the various layers - walls in layer "p01wall", fixtures in layer "p01fixt", poche in layer "p01poch", and so on. When the Multi-Layer Repeated Item is created, designate the *Multi-Layer Prefix* as "p01". When the RI is placed on a layer "p01ribase" and this layer is on for display, the walls will display on layer "p01wall", the

fixtures will display on layer "p01fixt", the poche on layer "p01poch" and so on. When the RI is placed on a layer "p02ribase" and this layer is on for display, the walls will display with layer "p02wall", the fixtures with layer "p02fixt", the poche with layer "p02poch" and so on. The portion of the base layer name before "ribase" (such as "p02") is substituted for the prefix designated when the RI was created ("p01" in our example) in the original display layer name.

2. Layer names are used for Variable layer names in Multi-Layer Repeated Items instead of layer numbers (+1, +2, etc.) because layer numbers in ARRIS are not necessarily consistent across drawings. The same layer may have 2 different numbers in 2 different drawings.

Nested Repeated Items

Multi-Layer Repeated Items may be nested (RI placed inside another RI). The layer of the nested RI will need to be "0" so it is treated as the same layer as the base RI, or the nested RI will need to be on a special layer which is on when you want the layers in the nested RI to display, otherwise the nested part of the RI will not display.

Multi-Layer Attributes and Other Entities

The same multi-layer flags may be placed on attributes which are placed in the same base layer as the RI occurrence but will display on other layers. There is not currently a command in ARRIS which places Multi-Layer Attributes on an RI. The same multi-layer flags and logic may be used to create other entities which are placed on a base layer but displayed with other layers. The core capability is in place for those who wish to create custom commands to use multi-layer features on Attributes and other entities.

DWG/DXF Translation

The Expert Translator from Expert Infocad is able to convert Multi-Layer Repeated Items to an AutoCAD DWG file. There are some differences between AutoCAD and ARRIS which are summarized below to clarify and prevent confusion.

1. The RI insertion layer must be turned on in ARRIS for the Multi-Layer RI to display properly. This is not the case in AutoCAD.
2. AutoCAD multi-layer blocks translated into ARRIS should work fine.
3. The block layers in AutoCAD are absolute and are not related at all to the layer where the block is placed. This is similar to the Fixed Layer placement in ARRIS. The exception in AutoCAD is geometry created in layer 0 which will occur and display on the layer where the block is placed. This is similar to ARRIS where geometry in layer "0" when the

RI is created will occur and display on the layer where the RI is placed.

4. The Variable layer placement will not work in AutoCAD since it only supports the fixed layer structure per block.

In a simple example, creating a Multi-Layer RI (block) in both softwares with entities on layers 0, 1, and 2, then placing the RI (block) on Layer 3, the difference is as follows:

- In AutoCAD:

  Turning layer 0 off will do nothing.

  Turning layer 1 off will not display entities on layer 1.

  Turning layer 2 off will not display entities on layer 2.

  Turning layer 3 off will not display entities on layer 0.

- In **ARRIS**:

  Turning layer 0 off will do nothing.

  Turning layer 1 off will not display entities on layer 1.

  Turning layer 2 off will not display entities on layer 2.

  Turning layer 3 off will not display any entities in the RI at all.

Special Edits

There are 3 *Special Edits* for each entity type, found on the **EDIT** pull down menu at the bottom of the menu. As the entity type is selected under the Entity Filter heading, the 3 Special Edit buttons at the bottom of the menu will change, reflecting edits appropriate for the new Entity Filter selected. Refer to the Edit and Entity Filters topics for more information.

DYNAMIC ROTATION: Dynamically rotates an existing Repeated Item per the *cursor rotation increment* (ci).

ARRIS will prompt for the Repeated Item to dynamically rotate. Select the Repeated Item using the F1 or F3 key. The cursor will be changed to a box on the screen representing the Repeated Item. Dynamically rotate the box by moving the cursor around the anchored Repeated Item origin point. End the rotation by a point input (F1, F3, F5, etc.). The existing Repeated Item will be repositioned to the new rotation.

Note 1: The *cursor rotation increment* (ci) can be set under RI rotation on the status menu.

SWAP NAMES: Replace existing Repeated Items with the current RI.

Depending on the *Search Method* selected, one or more Repeated Items will be replaced by the current Repeated Item. If the *Search Method* is not Single, and thus the search could contain more than one Repeated Item, ARRIS will prompt for the existing RI name to swap, with a default of All.

Note 1: When the current RI is swapped with the existing RI, the new RI will maintain the existing RI rotation and scale.

The **Repeated Item Select** menu also contains a Swap button, which functions the same as Swap Names with a Single Search Method. After selecting the Swap function, select a Repeated Item to be changed. The selected Repeated Item will change to the current Repeated Item. This function loops and will continue to prompt for a Repeated Item to swap until an F10 input is given to terminate the command.

SWAP FULL/ABBREVIATED: For very large repeated items, it is sometimes useful to have 2 different versions- a full version which contains all graphic entities in the RI, and an abbreviated version which shows only enough to get the general idea. Placing the abbreviated version in the database speeds display and search times since ARRIS has less data to work through. When the final version is needed for rendering or plotting, the full version of the repeated item may be swapped for the abbreviated one.

To facilitate this command, the abbreviated version of the repeated item must have the same name as the full version, followed by "_c".

Example: For a repeated item of a tree with the full version named "tree1", the abbreviated version should be named "tree1_c".

The command prompts for the direction of the swap - to *full* or *abbreviated*, the name of the RI to swap or all, and a fence containing the RI's to be swapped.

See Also

Repeated Item Library Manager, Repeated Item Catalog Manager, Catalog, Search Methods, Edit, Entity Filters & Attributes.