



ALLEGRIA SOFTWARE, INC.

A Technical White Paper

by Koushik Dutta

Vice President, Research & Development

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The Integration of ForReview with Matrix

Introduction

In today's corporate world and global marketplace, the need to share, view, mark-up and manage office documents, images and technical drawings has become a growing challenge. To address this need, Allegria Software, Inc., an innovator in image and documentation applications, has recently integrated *ForReview Professional*[™], a Windows-based enterprise-wide view and mark-up product, with *Matrix*[™], a Technical Document Management system designed for managing technical documents and drawings.

ForReview for Matrix is a version of *ForReview* that is seamlessly integrated with *Matrix*. This integration allows *Matrix* users to quickly and easily load documents directly into *ForReview* through the use of *Matrix*'s powerful object oriented interface.

It should be emphasized that the integration is implemented using *ForReview*'s powerful Application Programming Interface (API). None of *ForReview*'s underlying code is modified in any way. The integration module communicates with *ForReview* and *Matrix* through APIs or via DDE.

The module is designed using *Matrix*'s object oriented paradigm and provides pre-defined policy, relationship, format, type, and program objects. The mark-up type object is also derived from *Matrix*'s pre-defined annotation type object. To use, the user simply creates a business object to store documents and annotations. Now, just by clicking on this business object, the user can view, mark-up or print all the contained documents and the related annotations together or selectively. This saves many manual steps previously required and, more importantly, does not require the native application on the users system to view the file.

ForReview allows the user to generate mark-up files that are directly associated with the desired base (original) document. *ForReview for Matrix* protects original documents by not allowing them to be edited in any way. All changes and redlining are always performed on user-defined layers and saved in a separate mark-up file. *ForReview* automatically creates the relationship between mark-up files and their corresponding base document in the *Matrix* database and automatically checks in and out the base documents and mark-ups to and from the *Matrix* database. This allows the user to quickly find and access related mark-ups when querying about any file stored in *Matrix*.

There are essentially two modes of operation, being view and mark-up. In view mode, the user is not allowed to change any mark-ups on the base document, or create new mark-ups to the base document. Whereas in mark-up mode, the user is allowed to modify existing mark-ups and create new mark-ups. Any modified or newly created mark-up file will be saved to the database when the base document is closed. Furthermore, the mark-up files loaded are actually checked-out from the database, so it is impossible for any two users to make modifications to the same file concurrently.

In the next section, we review the functional architecture of *ForReview for Matrix*.

Functional Architecture

The integration is designed such that *ForReview for Matrix* can run independently of *Matrix*. When working in *Matrix*, *ForReview for Matrix* is launched only when a *ForReview* function is evoked, thereby saving the user the need to start *ForReview for Matrix* manually. *ForReview for Matrix* communicates directly with the *Matrix* database to retrieve and deposit the appropriate data.

ForReview for Matrix can be the viewer for any image format recognized by both *Matrix* and *ForReview*. The user, at any time, can update this relationship between the two systems through facilities in *Matrix*, but the initial relationship between the two systems is automatically created during installation for *ForReview for Matrix*.

Special delimiters are defined during the installation process of *ForReview* that keeps track of all relationships between a **Document Object** and its **Markup Object/s** within *Matrix*. This relationship is used when checking out files from *Matrix* to *ForReview*, or back into *Matrix* from *ForReview*.

During installation, *ForReview for Matrix* defines its recognized Document Object Type to be *ForReviewDrawing*. It also creates a new **Markup Object Type** called *ForReviewMarkup*, and a **Relationship Object**, which is also called *ForReviewMarkup*. The Relationship Object is a “one to many” relationship, having the *ForReviewDrawing* type as its domain, and the *ForReviewMarkup* type as its range.

The *ForReviewDrawing* type is just a default name. This means that you can assign a *different* Document Object type to be recognized by *ForReview* after *ForReview for Matrix* has been installed. Changing the recognized Document Object type will allow you to open any existing drawings that are assigned to Business Objects *other* than the *ForReviewDrawing* type. To gain access to a Business Object created under a different *Matrix* Business Object type, in *Matrix*, the user must create a NEW Relationship Object, mapping a “One to Many” relationship from the desired Business Object type to the **ForReviewMarkup** Object type (defined by the *ForReview for Matrix* installation). After this relationship has been established, the user needs to make a simple edit to the **[MATRIXDEF]** section in **FWTMTX.INI** (found in the **PREFS** directory where *ForReview* was installed). For more information please see **File Relationship and Association** located under the **Matrix|Help on Matrix** menu item in *ForReview for Matrix*.

The Check-in/out Process

To modify or create mark-ups while in *Matrix*, select the Business Object to be reviewed, highlight any number of files (base documents) of a given format, then select the **View** menu item. At this time, *Matrix* automatically starts an intermediate module program supplied by *ForReview for Matrix*. The integration module program loads a DLL that establishes a communications channel between *Matrix* and *ForReview*.

When *ForReview* is initialized from *Matrix* for the purpose of viewing, marking-up or printing a file, a dialog will appear that allows the user to select one of three available modes of viewing. The **View Only** option allows the user to only view documents. The **View and Markup** option allows the user to view both documents and mark-up files, but does not allow editing of mark-ups. The **View and Edit Mark-ups** option allows the user to view documents and create and/or edit mark-up files.

After the mode has been selected, *ForReview* creates a copy of the chosen file/s, stores the copy in a temporary directory, then displays the file/s in *ForReview*. If a requested file has any existing associated mark-ups, then a list of these mark-up files is then retrieved through an automatic query to the database. This list, along with any pertaining attributes (such as file path name, owner, object name, revision number, etc.) is presented in the **Choose Markup Files To Load** dialog, allowing the user to selectively choose which mark-up files are also to be loaded into *ForReview for Matrix*. As with the base document, a temporary copy of each selected mark-up file is made and stored in the same temporary directory. If any two mark-up filenames match in the temporary directory, then the second mark-up file is renamed to a temporary name. After all editing is complete, the user then checks the mark-

up file/s back into *Matrix*. The user, at this point, is given the option to create any new *Matrix* Markup Objects that may be required to hold any new mark-up files that were just created.

While in *ForReview for Matrix*, the user can also perform all the above described check-in and check-out procedures by simply using the **Matrix** menu item. The **Matrix** menu includes four options: 1)Checkin Markups, 2)Checkout Markups, 3)Checkout Drawings and 4) Help on Matrix .

From within *ForReview for Matrix*, the user can also view, print and mark-up documents without starting *Matrix* if the desired base documents exist within a *Matrix* Business Object defined as a *ForReviewDrawing* type. To do this, the user simply starts *ForReview for Matrix* from its program icon. Once *ForReview* is launched, the **Enter a Business Object Name** dialog will appear, prompting the user to enter an appropriate Business Object Name, Revision Number, and Lattice Name. Clicking the **OK** button to this dialog will then open the **Checkout Document with Mode of Entry** dialog. This dialog produces a list of base document files that exist in the chosen Business Object, allowing the user to selectively choose what file/s to check-out.

Sometimes a user can more easily select a mark-up file instead of a document file, and may want to view the mark-up file with its corresponding document file. *ForReview for Matrix* will automatically detect these cases, and access the appropriate document file for the selected mark-up file.

Which ever way a base document was loaded into *ForReview*, if the **View and Edit Mark-ups** mode was chosen, the user can now proceed to “mark-up” the base document using facilities provided in *ForReview for Matrix*. *ForReview for Matrix* keeps track of the base document and its mark-ups as “external”, to distinguish them from its “native” mark-ups created outside of the *Matrix* database.

When the user has finished redlining the base document, the integration module is notified of this action through callback functions set in *ForReview for Matrix* by either closing the base document or by explicitly unloading a particular mark-up file. The integration module will either update the database for an existing mark-up, or allow the user to create a relationship between the base document and the mark-up, then store the new mark-up file into the database. If the user created a new mark-up file, then the user will be prompted to either 1) select an existing Markup Object into which this file will be placed, or 2) create a new Markup Object to contain this new mark-up file. After all mark-ups for a particular base document are unloaded, the document is closed, and all related copies in the temporary directory are automatically deleted.

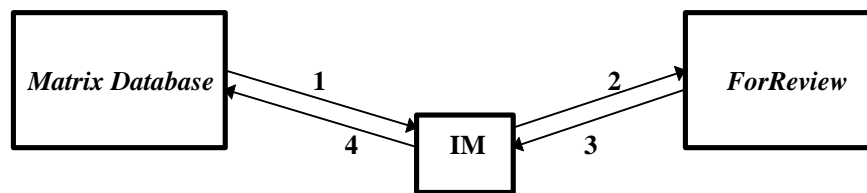


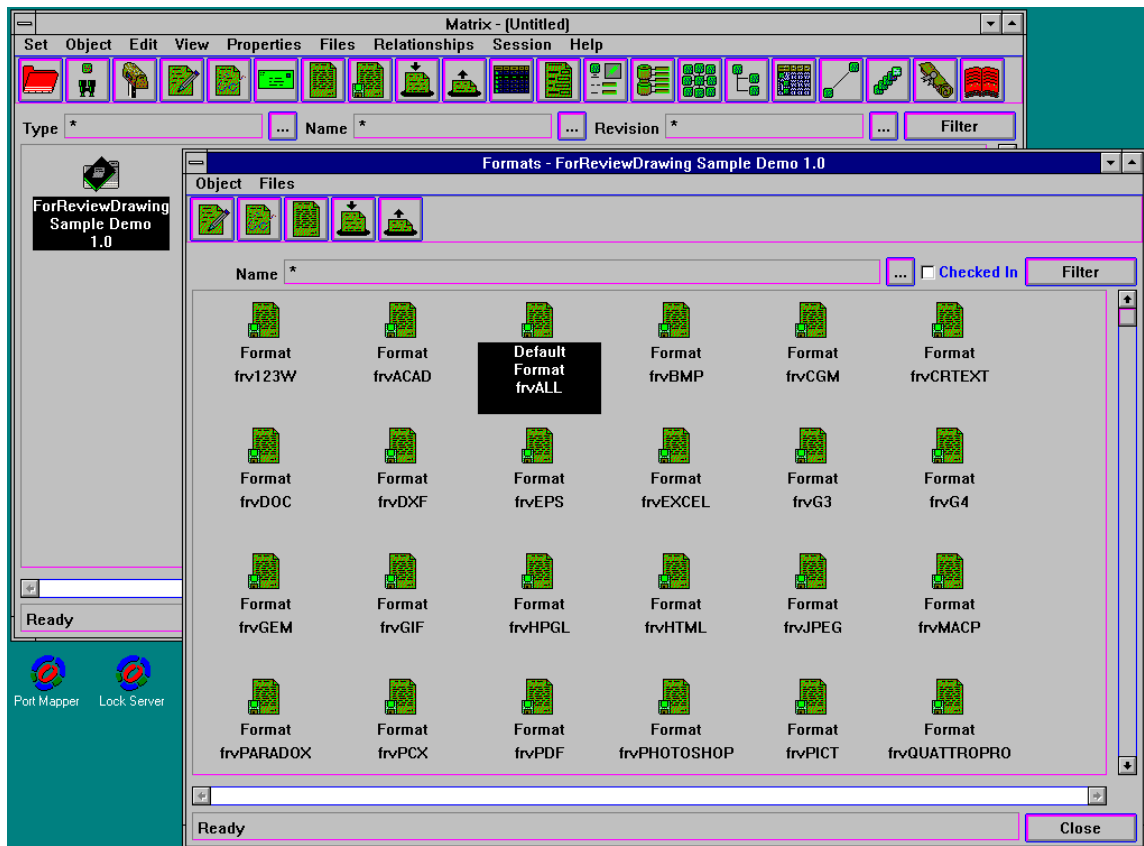
Fig. 1 Flowchart of functional architecture

1: Object information is retrieved from the *Matrix* database and passed to the integration module (IM). 2: After processing the information, the integration module loads the base document and associated mark-ups into *ForReview*. 3: When the user is finished marking-up the base document, *ForReview* informs the integration module of changes using callback functions that the integration module has set in *ForReview*. 4: The integration module stores the new or modified mark-ups back into the *Matrix* database by calling the appropriate *Matrix* API's.

An Example

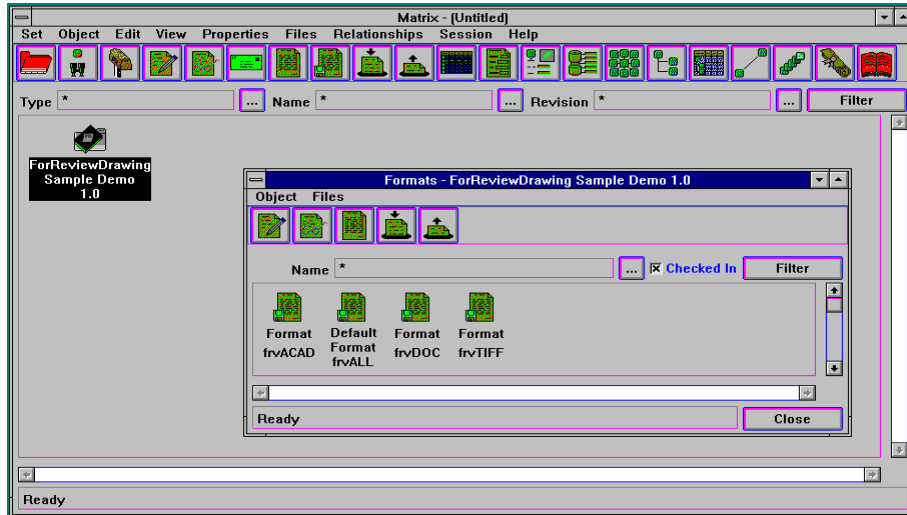
The following is a step-by-step guideline to help you quickly learn how to utilize *ForReview for Matrix* for important tasks. First you will learn how to check-in new drawings to the *Matrix* database that under a Business Object type that is recognized by *ForReview*.

1. Create a Business Object in *Matrix* with type **ForReviewDrawing** and policy **ForReviewDrawing**.
2. During the *Matrix/ForReview* setup, approximately 30 formats are pre-defined, such as **frvAll**, **frvTIFF**, **frvACAD** and **frvDOC**. To see the pre-defined formats, highlight the desired Business Object, then click on the right mouse button. This will bring up a menu from which you would select **Formats**.



3. The user is allowed to check-in files by format in the *ForReview* Business Object by selecting a format, and then going to the **Files...** menu and clicking on **Checkin...**. Follow your normal *Matrix* procedure for checking in files.
4. Perform the above step for the following 4 formats using the sample files in *ForReview*'s SAMPLE directory on your local drive.

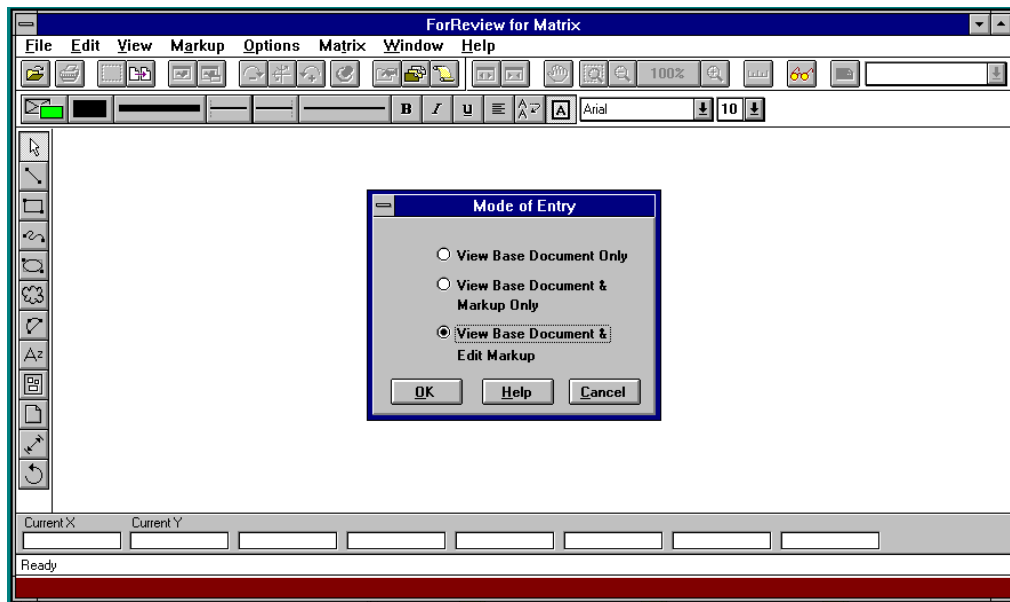
<u>Format</u>	<u>Filename</u>
frvACAD	OFFICE.DWG
frvTIFF	EXPLODED.TIF, FLAMIGO.TIF, MULTIPIC.TIF
frvDOC	SAMPLE.DOC
frvALL	APPLE.PCT, ASTRO.GIF



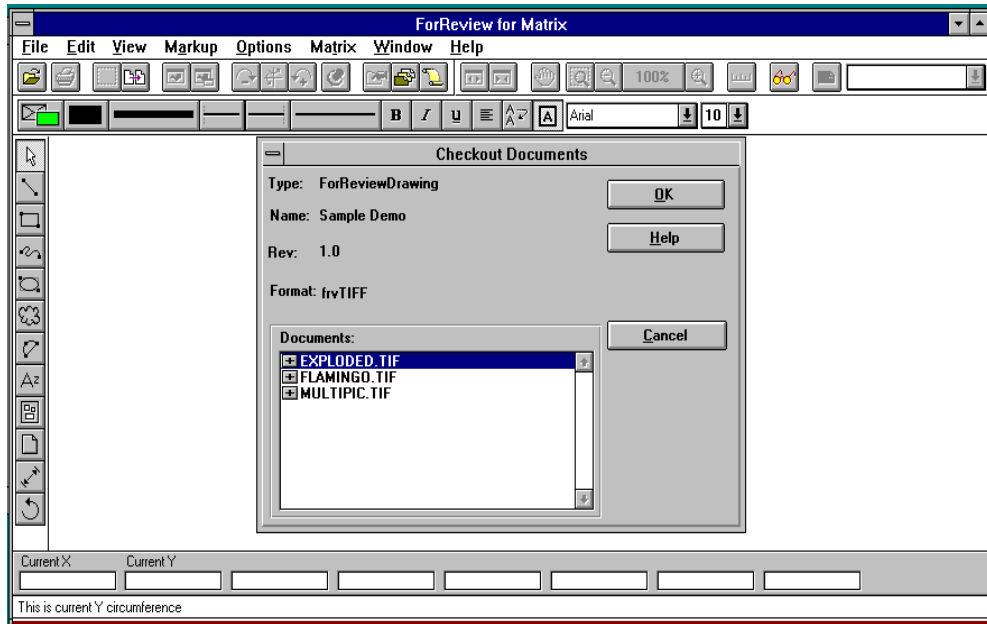
5. Now you are ready to view, print or mark-up files stored in that Business Object.

6. To view, edit (mark-up) or print all files for a format, select the desired format in the Business Object, then right mouse click and select either **View** or **Print**. This action will allow you to choose to what files to load into *ForReview* from a list of all files available in that format. For example, when you select the format **frvTIFF** and right mouse click on **View**, *ForReview* will be automatically launched, allowing you to view/print any one, some or all files listed under that format. When the **View** option is selected, *ForReview* brings up a dialog box allowing the user to choose the *mode of viewing*. (When **Print** is chosen, the file/s will be automatically be loaded in the **View Base Document and Mark-up Only** mode, which will not allow any editing to take place.)

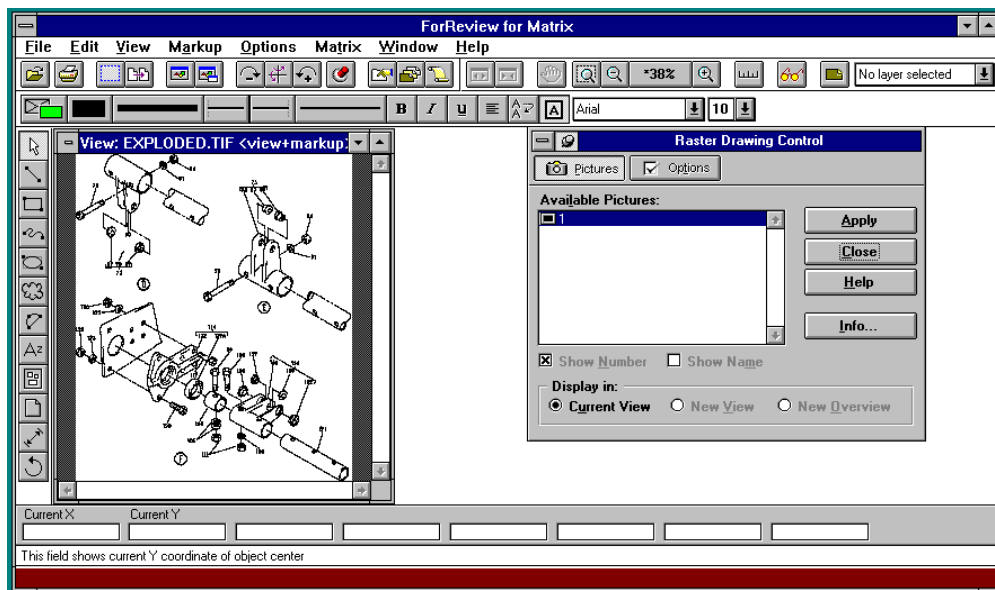
For this tutorial, highlight the **frvTIFF** object, right mouse click and choose the **View** menu item, then choose the **View Base Document & Edit Markup** mode.



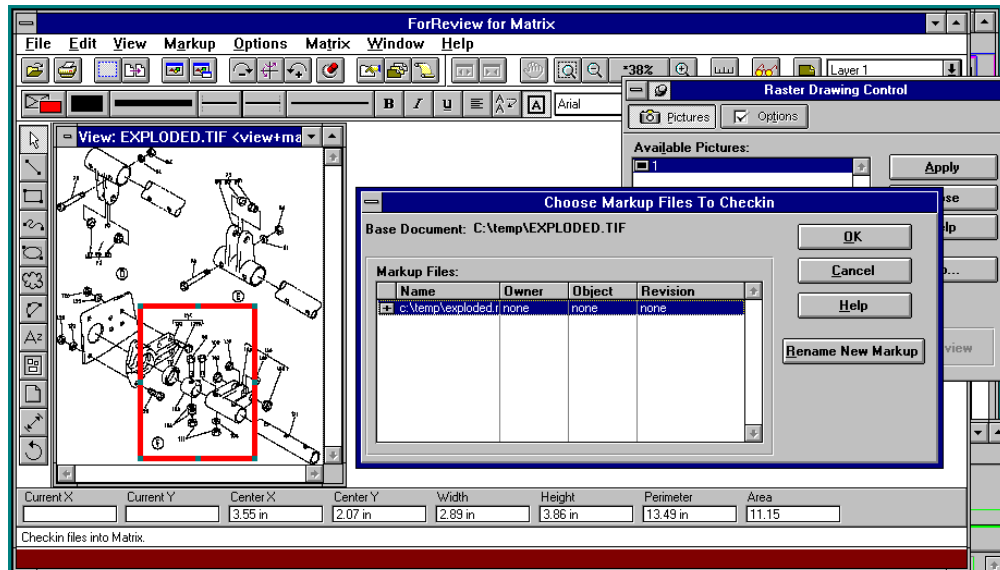
- Next, a **Checkout Documents** dialog will appear that allows the user to select the files to view for the chosen format.



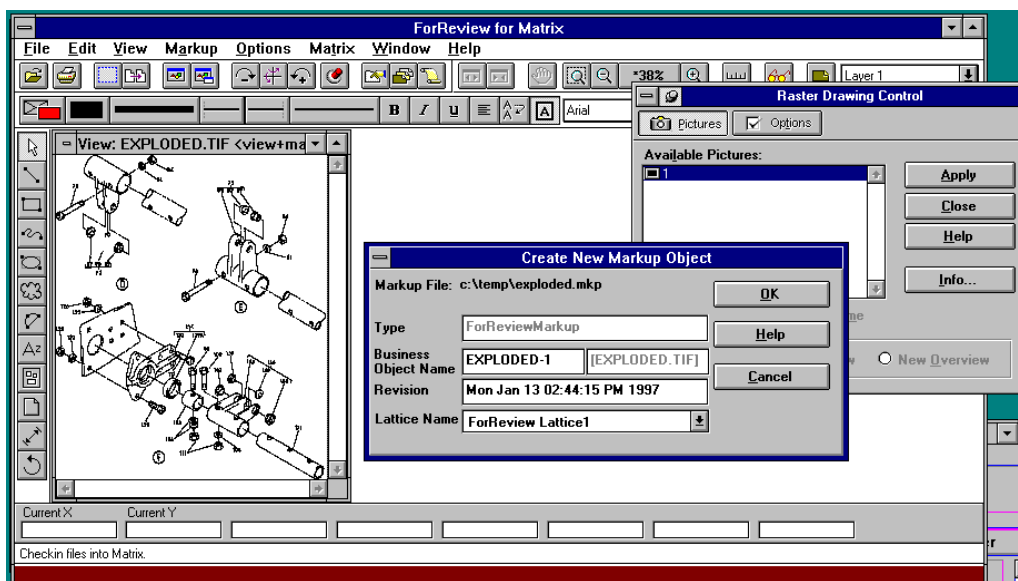
- You can now select one or more files from the *Documents* list in which to check-out. The *plus* sign before a file indicates that you DO wish to check it out, and the *minus* sign before the file indicates that you DO NOT want to check it out. The sign can be toggled to *plus* or *minus* by simply double-clicking on it. For this tutorial, toggle the sign before the file **EXPLODED.TIF** to *plus*, and to *minus* before all other files. Click on **OK**. *ForReview* will then automatically load the document in the selected view mode. (If this drawing had any *existing* mark-up files associated with it, the **Choose Mark-up Files to Checkout** dialog would be displayed at this point, allowing you to choose which mark-up files you wish to view as well. Because **EXPLODED.TIF** does not, the dialog is automatically ignored.)



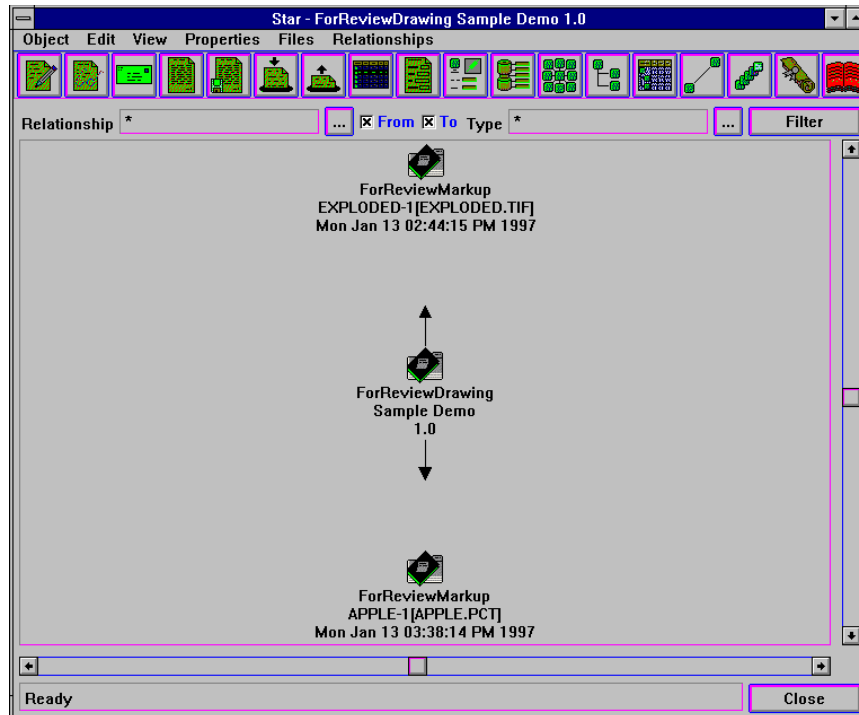
9. With **EXPLODED.TIF** displayed in *ForReview*, go ahead and create some mark-ups. To assist you in creating these mark-ups, please refer to *ForReview's Getting Started Guide*.
10. After you have created several mark-up objects, click on **Matrix** located on the main menu bar, then select the **Checkin Markups** option from the drop-down menu. This will display the **Choose Markup Files To Checkin** dialog, listing of all the mark-up files that have been edited or created for the current document, allowing you to selectively check-in these mark-up files. A *plus* sign before the filename indicates that the mark-up file is to be checked in. You can toggle the *plus* sign to a *minus* sign by double clicking on the selected item in the list.



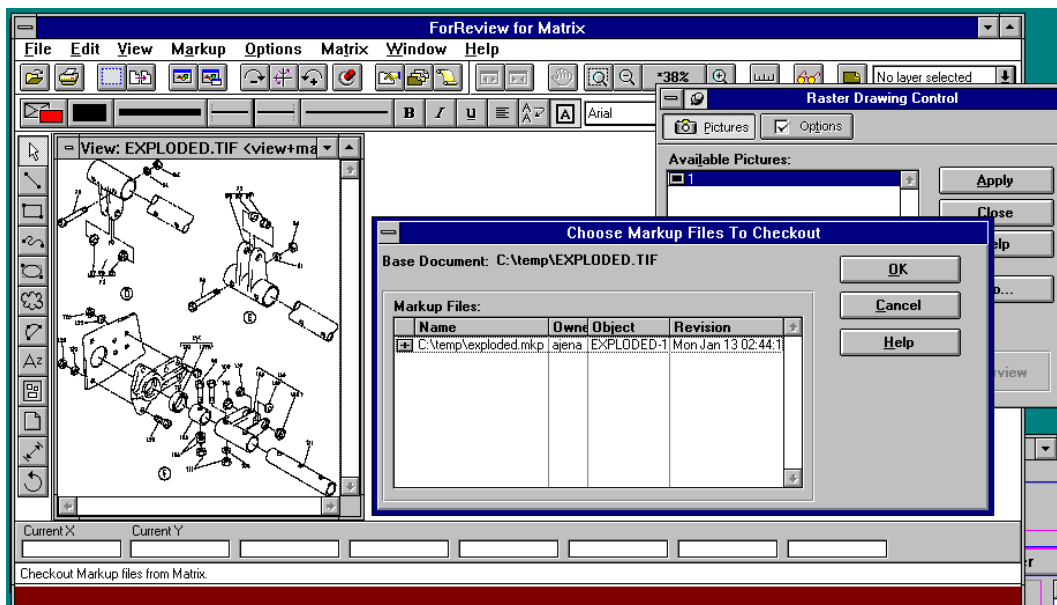
11. Clicking on the **OK** button will begin the check-in process for the chosen mark-up file/s into the *Matrix* database. If the base drawing (in this case, **EXPLODED.TIF**) does not have an existing *Business Markup Object*, the **Create New Markup Object** dialog is displayed. Here, you would enter a new *Business Markup Object* and *Revision* name, then select a *Lattice Name* from the drop-down menu. If a Markup Object already exists for the base drawing, then the **Choose Markup Object** dialog is displayed. The user can either create a new Markup Object or store the new mark-up file in an existing Markup Object. In this example, store the mark-up file in its own new Markup Object.



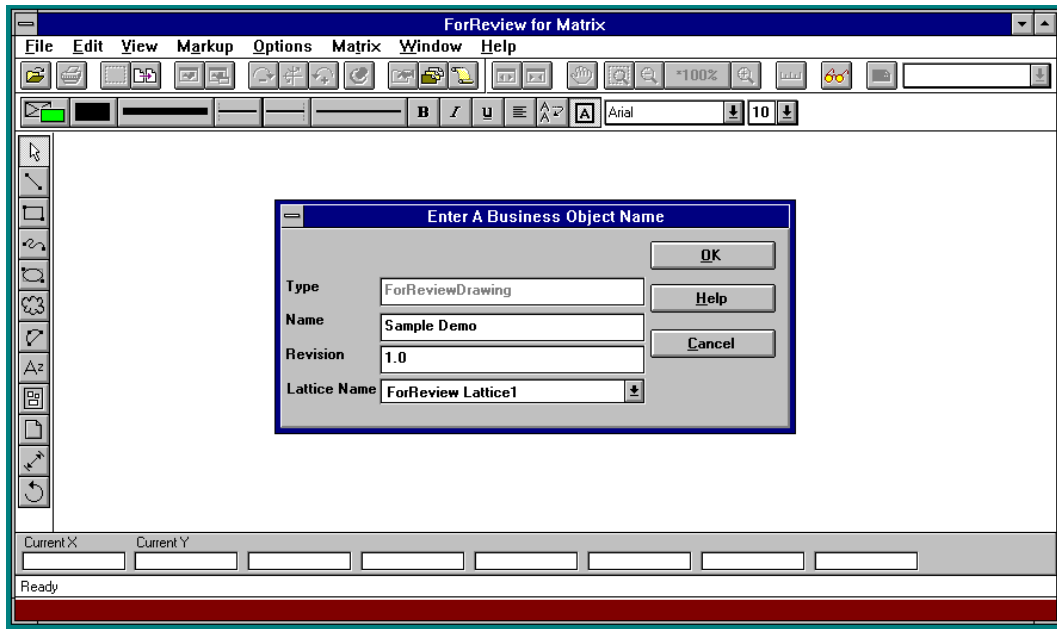
- Once check-in is complete, the mark-up file will no longer be displayed in *ForReview*. To see what this new relationship will look like in *Matrix*, exit *ForReview*, go to *Matrix*. Select the Business Object and then select the **STAR** icon.



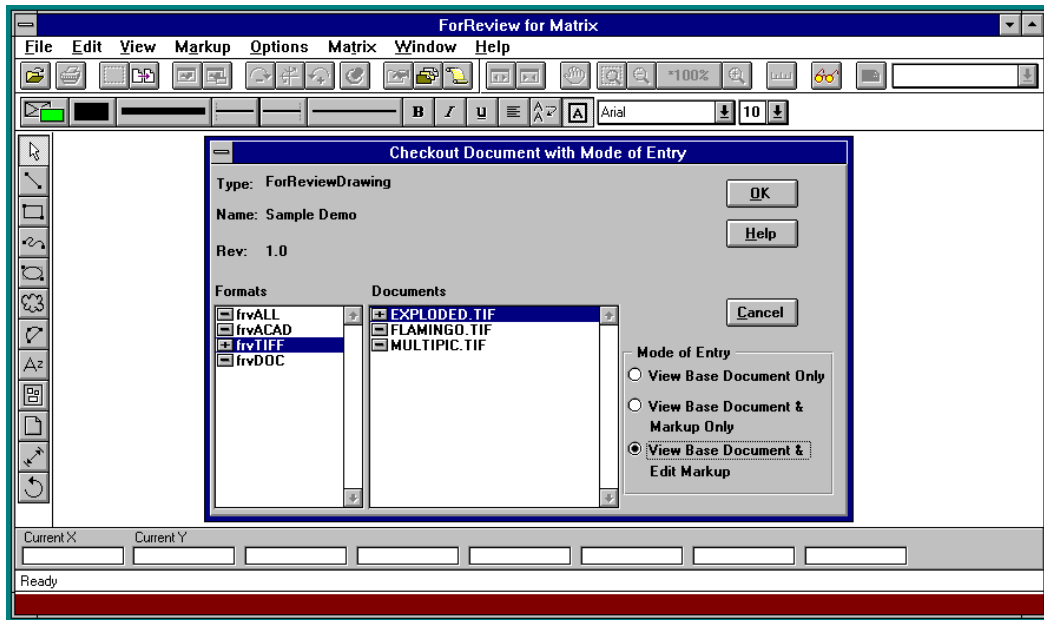
- Now let us view a file that has mark-ups already associated with it. To do this, you can select either from the *Mark-up Object* or from the *Business Object*, then go to the respective **Format** dialog. Select the format of the file to be viewed, click the right mouse button and choose **File**. Now select a file, (for example, **EXPLODED.TIF**) then click the right mouse button and choose **View**. Note that a new dialog appears in *ForReview* called **Choose Markup Files To Checkout**, allowing you to select the mark-up files that you wish to view along with the file.



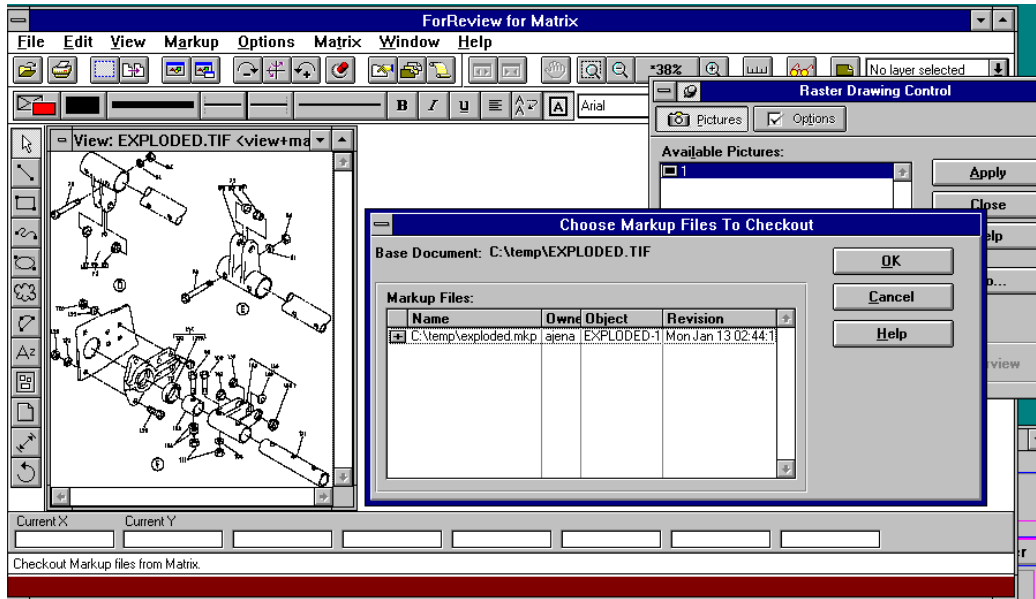
14. While *ForReview* is running, you can check-out additional documents from the *Matrix* database at anytime by clicking on **Matrix** located on the main menu bar, then selecting the **Checkout Drawings** option from the drop-down menu. This will display the **Enter A Business Object Name** dialog.



15. After you enter a valid Business Object, *ForReview* will display the **Checkout Document with Mode of Entry** dialog, which produces a list of existing formats and files in that object. You have an option to select one or more files in different formats. Here, the *minus* sign before each item in the **Format** list indicates that you DO NOT want to view any files in that format. The *plus* sign indicates, you DO want to view files for that format. Similarly, in **Files** list, you can select one, some or all files by toggling the *minus* sign to the *plus* sign. The **Mode of Entry** can be changed for each individual file in each format by selecting any one of the three view options (**View Base Document Only**, **View Base Document & Markup Only**, or **View Base Document & Edit Markup**). When you click the OK button, the chosen documents will be checked-out of the *Matrix* database, and displayed in *ForReview* sequentially.



16. You can also check-out any additional mark-up files for the current document at anytime. To do so click on **Matrix** located on the main menu bar, then select the **Checkout Markups** option from the drop-down menu. This will display the **Choose Markup Files to Checkout** dialog. Clicking the **OK** button tells *ForReview* to load the mark-ups that have their sign toggled to *plus* symbol.



This concludes the step-by-step guideline. For additional help, please refer to *ForReview*'s extensive On-line Help. You can access it by clicking on **Help** located on the main menu bar in *ForReview*. Specific help on the *Matrix/ForReview* integration is also available by clicking on **Matrix** located on *ForReview*'s main menu bar, then selecting the **Help on Matrix** option.