**TABLE 8-5 Fundamental Entities for the SoundStage Project**

| Entity Name | Business Definition |
|---|---|
| AGREEMENT | A contract whereby a member agrees to purchase a certain number of products within a certain time. After fulfilling that agreement, the member becomes eligible for bonus credits that are redeemable for free or discounted products. |
| MEMBER | An active member of one or more clubs.<br>Note: A target system objective is to reenroll inactive members as opposed to deleting them. |
| MEMBER ORDER | An order generated for a member as part of a monthly promotion, or an order initiated by a member.<br>Note: The current system only supports orders generated from promotions; however, customer-initiated orders have been given a high priority as an added option in the proposed system. |
| TRANSACTION | A business event to which the Member Services System must respond. |
| PRODUCT | An inventoried product available for promotion and sale to members.<br>Note: System improvement objectives include (1) compatibility with new bar code system being developed for the warehouse, and (2) adaptability to a rapidly changing mix of products. |
| PROMOTION | A monthly or quarterly event whereby special product offerings are made available to members. |

Our SoundStage management and users initially identified the entities listed in Table 8-5. Notice how the definitions contribute to establishing the vocabulary of the system.

## > The Context Data Model

The next task in data modeling is to construct the context data model. The context data model should include the fundamental business entities that were previously discovered as well as their natural relationships.

Relationships should be named with verb phrases that, when combined with the entity names, form simple business sentences or assertions. Some CASE tools, such as *System Architect,* let you name the relationships in both directions. Otherwise, always name the relationship from parent to child.

We have completed this task in Figure 8-13. This figure represents a data model created in *System Architect.* Once we begin mapping attributes, new entities and relationships may surface. The numbers below reference the same numbers in Figure 8-13. The ERD communicates the following:

1. An AGREEMENT binds one or more MEMBERS. While relationships may be named in only one direction (parent to child), the other direction is implicit. For example, it is implicit that a MEMBER is bound to one and only one AGREEMENT.
2. A MEMBER has conducted zero, one, or more TRANSACTIONS. Implicitly, a given TRANSACTION was conducted by one and only one MEMBER.
3. A MEMBER ORDER is a TRANSACTION. In fact, a given MEMBER ORDER may correspond to many TRANSACTIONS (for example, a new member order, a canceled member order, a changed member order, etc.). But a given TRANSACTION may or may not represent a MEMBER ORDER.
4. A PROMOTION features one or more PRODUCTS. Implicitly, a PRODUCT is featured in zero, one, or more PROMOTIONS. For example, a CD that appeals to both

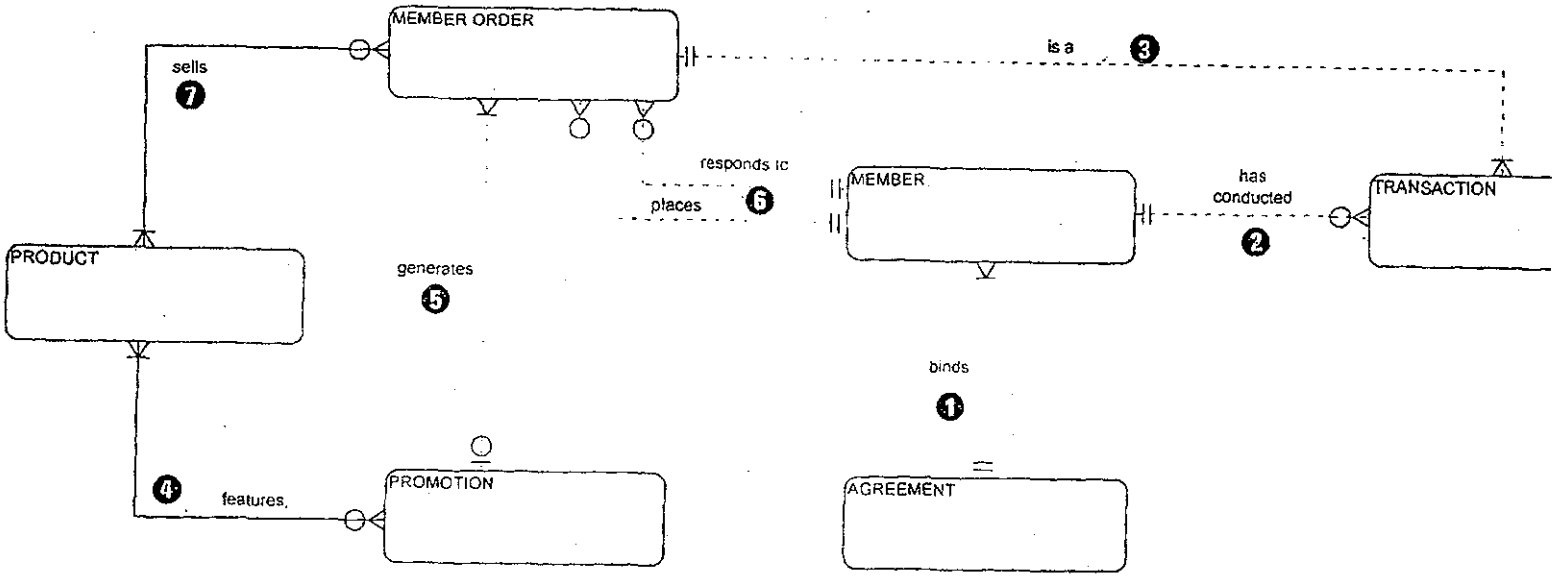


FIGURE 8-13 The SoundStage Context Data Model

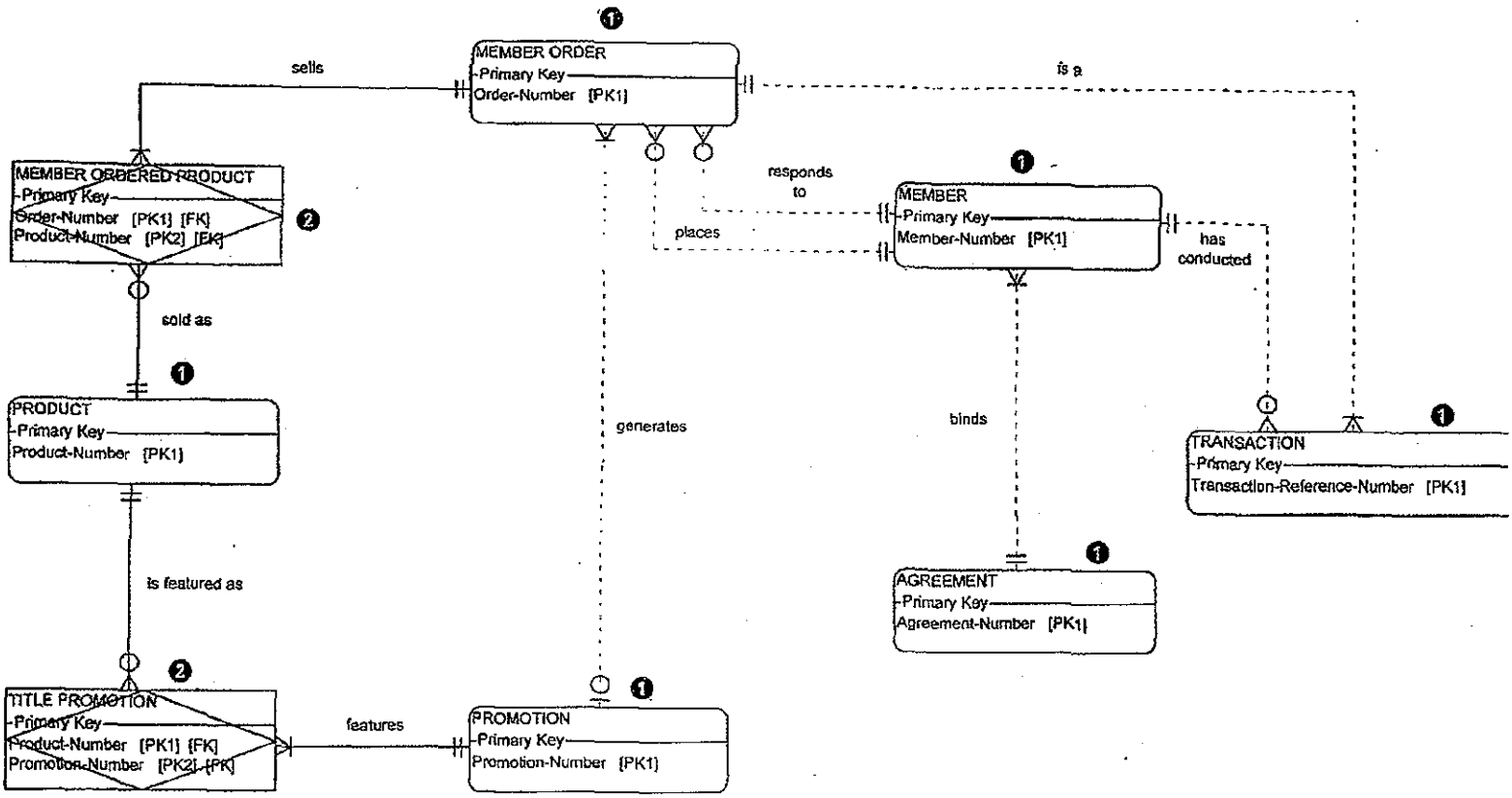


FIGURE 8-14 The SoundStage Key-Based Data Model

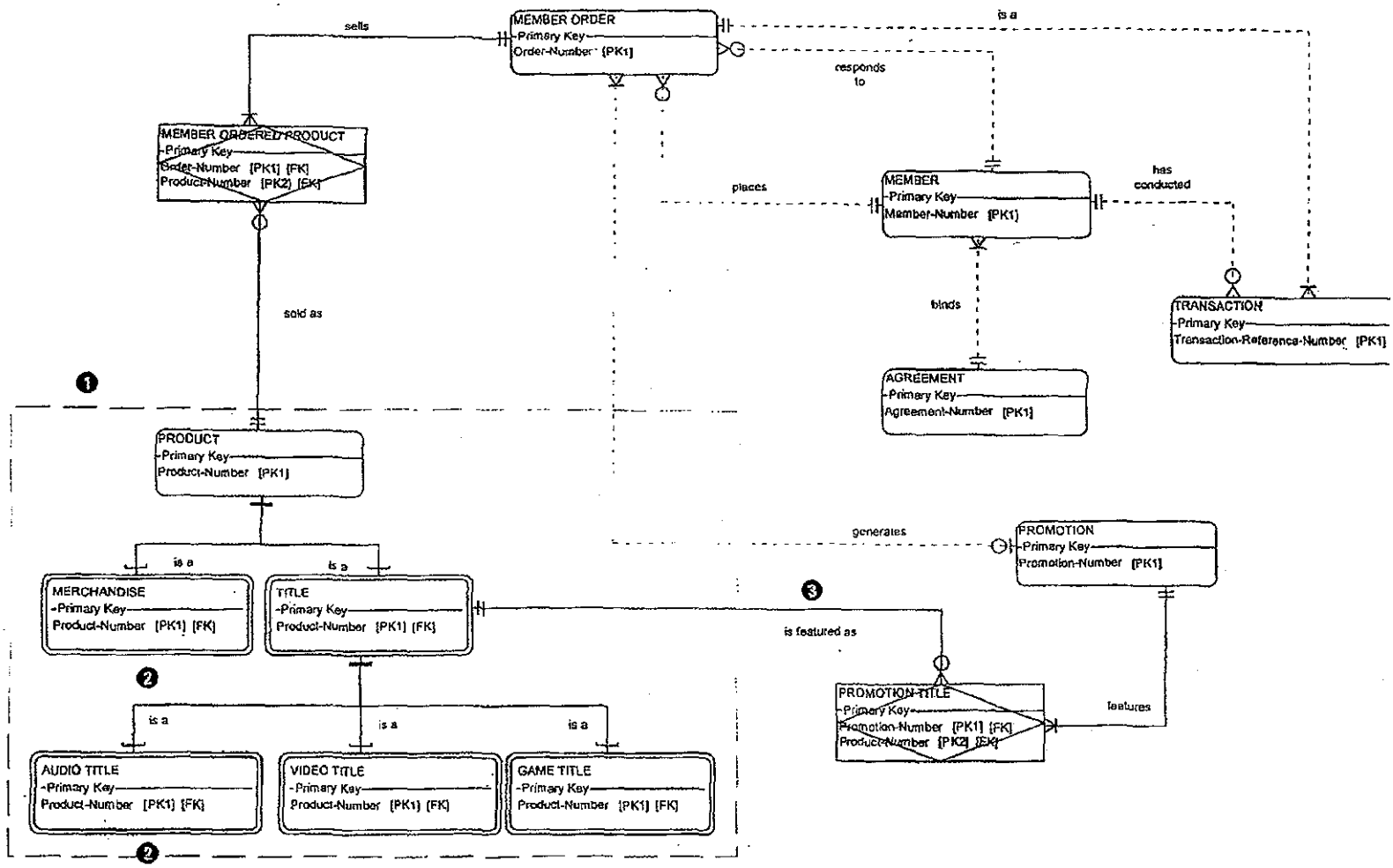


**FIGURE 8.15** The SoundStage Key-Based Data Model with a Generalization Hierarchy

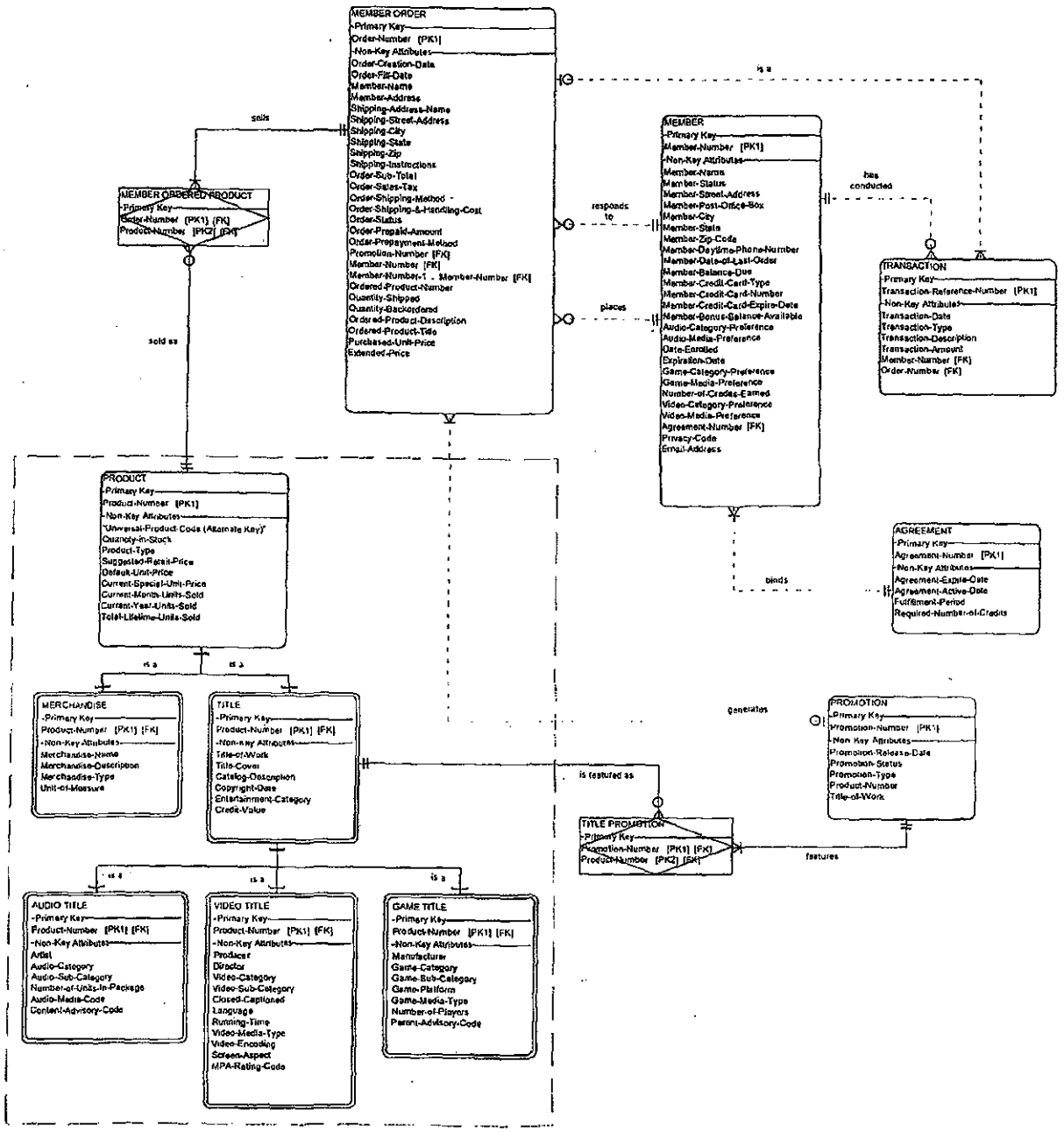


**FIGURE 8-16** The SoundStage Fully Attributed Data Model

- An attribute's domain should not be based on logic. For example, in the SoundStage case we learned that the values of MEDIA were dependent on the type of product. If the product type is a video, the media could be VHS tape, 8mm tape, laserdisc, or DVD. If the product type is audio, the media could be cassette tape, CD, or MD. The best solution would be to assign separate attributes to each domain: AUDIO MEDIA and VIDEO MEDIA.

Figure 8-16 provides the mapping of data attributes to entities for the definition phase of our SoundStage systems project. While the fully attributed model identifies all

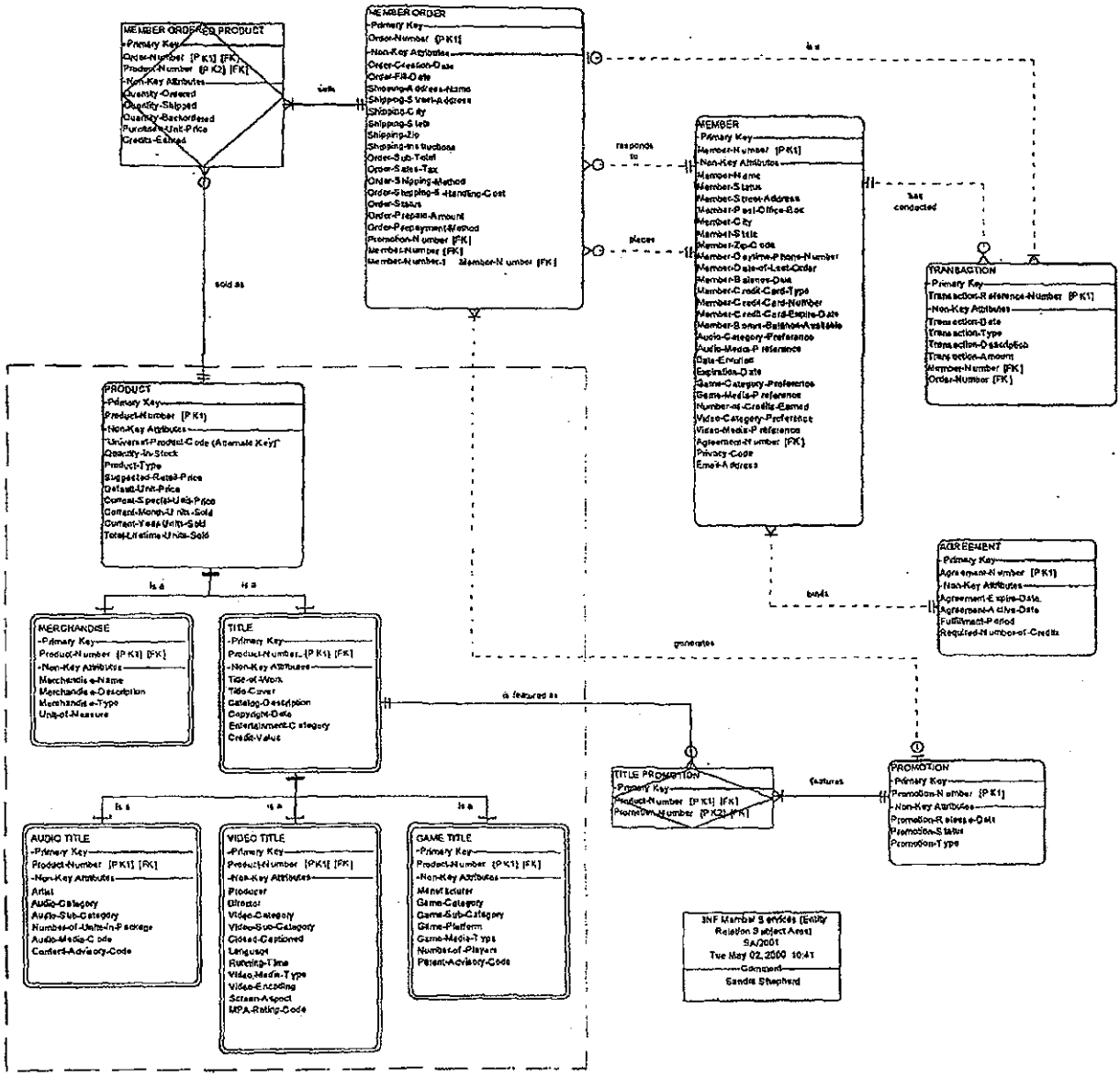


FIGURE 8-2.3 Second Stage Logical Data Model in Third Normal Form (3NF)