

Atari Central, Functional Requirements Specification, Revision B

The document itself begins on the next page.

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Note that these backup tapes contain A LOT of information spread out in many folders, meaning it will take time to process the important bits.

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Comments:

This document, written at the beginning of 1983, is truly visionary and describes avant-garde services that have become standard today: access to forums, a mailbox, documents & manuals, downloadable programs & games, a multi-player platform, live events, contact with Atari staff members, etc.

Note, however, that it seems to be aimed at enthusiasts or just an elite, since it mentions 300-600 simultaneous connections to the system.

I can't make up my mind whether this document is complete or not. Does paragraph \$2 just contain titles of documents that should have been appended, or is it just a list of entries to be written/completed later? When in doubt, I chose the "Very Advanced Draft" status. Also, I wonder what the Atari Telecommunity, TeleRental and TeleSale services are... I also wonder what the SuperHeroes Network is...

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Atari Central, Functional Requirements Specification, Revision B

Joe Miller
March 4, 1983

COMPANY CONFIDENTIAL

APPROVED BY:

Director, Software Development Date

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1. Purpose

1.1 Introduction and Product Description

A number of rapidly developing technologies are clearly complementing and stimulating each other. The synergy of home computers, telecommunications, videotex, electronic games, and centralized databases are beginning to have dramatic effects on suppliers and consumers alike. National communications systems, first railroads and waterways, then roads and airlines, now telecommunications and broadcasting, are the very stuff that holds together the fabric of our geographically vast nation. Perhaps it's this dependence for survival on communications that has provided the spur to our share of technological leadership.

There is little argument that the western world is in the midst of an information explosion. It is not that we desire more information; there is too much information now and many of us cannot cope with what we have. Information systems will penetrate into homes, in part, because people are placing increased value on being able to find the right information at the right time and on being able to act on that information immediately, with the least possible difficulty.

As leaders in the effort to place innovative computing power in the home, ATARI must be willing to participate in the integration of the "information industries." Most current projections conclude that this integration is still in the "wind-up" phase, with explosive growth and acceleration expected to begin around 1985. The "ATARI CENTRAL" concept, while providing specific short-term strategic value, will help us execute a smooth transition.

ATARI CENTRAL is a set of products and services expressly designed for delivery via ATARI home computers and a national communications network. By paying a fixed, monthly subscription rate, owners of ATARI computers will make a local telephone call and communicate directly with other ATARI owners across the country. They will have access to newsletters, product announcements, and special features.

Part of the added value of ATARI CENTRAL will be the ease with which users can add to their own software libraries by downline-loading special Atari offerings. And, as participation grows, the network will provide a large library of user-contributed, public domain software. In short, ATARI CENTRAL gateways the home computer user into a well-defined "global village". By its nature, this undertaking will be dynamic and self-evolving to a great degree.

This specification outlines the sequence of requirements which must be met to "prime the pump." Certain recommendations for follow-up strategies are also made; these should be treated with a lower implementation priority.

The strategic values and specific marketing outcomes of ATARI CENTRAL are numerous:

- It will provide a tangible incentive to prospective ATARI computer buyers by offering services and support unavailable with other systems.
- This product differentiation will promote high visibility and rapport with the consumer market.
- It will encourage sales of ATARI telecommunications hardware and software products.
- By operating the network on a subscription basis, it will provide a source of direct revenue to ATARI with minimal overhead.
- ATARI CENTRAL will help us develop the expertise necessary for a smooth transition into next-generation networks.
- It will provide us with a direct channel of market feedback.
- Finally, it will provide a strong vehicle for innovation. Pioneering ATARI CENTRAL can drive us to discover new techniques and applications for personal computing.

The concept presented in this document uses a technology commonly known as "videotex." The major characteristic of these systems is support of a low-cost, two-way communications architecture. In this case, members of ATARI CENTRAL use the public telephone network to control the information flow.

There is currently another proposal circulating within ATARI promoting the use of "teletext" technology for electronic distribution of ATARI software. Teletext systems do not support a two-way communication path.

Both implementation strategies warrant thorough investigation because they address different market needs, and should not be considered mutually exclusive.

1.2 Consumer Profile

ATARI CENTRAL shall be appropriate for use by all owners of ATARI home computers. Initially, it is expected that users of this service will represent the 'high-end', sophisticated computer user. These users currently provide our front-line, grass-roots support in the field, and, in many cases, author ATARI product reviews in the trade publications. The direct market rapport fostered by ATARI CENTRAL will resurface in many beneficial ways.

Another key subset of system users will be our distributors and retail sales personnel. Their ability to demonstrate ATARI CENTRAL's direct communication link with other new owners, and with ATARI itself for technical support, can leverage many sales on its own merit.

1.3 Interface with Other Products

ATARI CENTRAL shall interface with the 400/600/800/1200 family of mainframes. It shall also interface with all ATARI telecommunications products, including the 835 direct-connect modem and the 850 Interface Module.

1.4 Family of Products

ATARI CENTRAL belongs to a new class of products, perhaps to be called "netware."

1.5 Distribution

The local software developed for ATARI CENTRAL, that which resides in the home computer, shall be produced in cartridge and disk form and shall be offered through normal ATARI software distribution channels.

The host software developed for ATARI CENTRAL shall initially reside on the CompuServe Information Service. These computers are accessible via a North American network of X.25 packet-switched common carriers, such as TYMNET, Telenet, and CompuServe's own distributed communications equipment.

Approximately 90% of ATARI CENTRAL users will place a local telephone call to acquire access to the system. The remaining users, at a higher monthly subscription rate, may choose to enter the system via WATS lines. (In fact, the toll-free number '800 NETWORK' is currently available.)

2.0 Applicable Documents

The concept of providing electronic videotex services in the consumer marketplace has received a number of treatments at ATARI over the last two years. Most of these documents have been appended for ease of reference.

2.1 The ATARI Telecommunity – An Online Computer Network

2.2 The ATARI TeleRental System

2.3 The ATARI TeleSale System

2.4 The SuperHeroes Network – Preliminary Specification

2.5 ATARI Starfleet Central – A Concept Paper

2.6 TeleScope – Preliminary Product Definition

2.7 CompuServe Information Service Terminal Standards

2.8 CompuServe 'A' Protocol Description

2.9 Christensen 'XMODEM' Protocol Description

2.10 An Interactive Diskette System

3.0 Requirements

The realization of ATARI CENTRAL will require development activity and resource allocation on two parallel courses:

- (1) Coordination and development of software to reside on the host mainframe, initially to be the CompuServe Information Service; and
- (2) Development of local, microcomputer-based communications software.

The functional requirements for both areas are presented herein. It must be emphasized, however, that this will be a dynamic and self-evolving endeavor, in many ways, shaped by the user community.

For this reason, it is appropriate to "stage" the implementation of some ATARI CENTRAL features. Requirements which are considered crucial for a debut of the system have been flagged throughout this specification with the symbol '<*>'.

3.1 Interfaces

3.1.1 Physical

The minimum system requirements, for user access to a subset of ATARI CENTRAL, are an ATARI 400, an 835 direct-connect modem, and a telephone line.

To fully utilize the network will require an 800/1200 computer, one 810/1050 disk drive, 835 or 1030 modem, joystick, telephone line, and a printer.

3.1.2 Logical

The local software shall be developed in a language that emphasizes, in order of priority, modular organization, readability, portability, and efficient memory utilization.

Some candidates are 'C', Pascal, and assembly language.

3.1.3 Human / Machine

ATARI CENTRAL shall be designed to effectively communicate with users at both ends of the computer-proficiency spectrum. Both local and remote software modules shall contain liberal HELP screens. Throughout the evolution of software development for ATARI CENTRAL, certain trends shall be maintained.

The primary trait exhibited by the host-resident software shall be its ability to "actively filter" data presentation to the user. For example, initially ATARI CENTRAL shall filter data by allowing the user to make choices from a tree-structure of fixed menu displays <*>.

Later, as users gain more familiarity with the services and databases available, they should be able to construct personalized menus routing them directly to areas of individual interest.

Finally, the host software can be designed to use periods of low activity to scan the database and build user-specific routers based on "interest profiles" entered by an individual.

The local software architecture shall exhibit the primary trait of "remote extensibility." That is, it will contain a set of fixed primitives that can be enhanced, or even replaced, under control of the network software. It shall also provide structures to increase the efficiency of the communications channel. For example, the network software may need to transmit menu pages only once per session; subsequent requests for each menu can be satisfied locally.

3.2 Functional Requirements

3.2.1 ATARI CENTRAL Host-resident Software

The following paragraphs describe the functional requirements for the host-resident portion of ATARI CENTRAL.

An important first step in the ATARI CENTRAL development process will be the execution of appropriate business agreements with CompuServe, Inc. in order to provide this service on a subscription basis. Under this agreement, CompuServe will issue special access numbers to subscribers of ATARI CENTRAL for a fixed, monthly fee of between \$25 and \$50. When a user enters his access number, upon signing into CompuServe, he will be taken directly to ATARI CENTRAL.

The user can, if he chooses, exit the 'umbrella' of ATARI CENTRAL into other services supported by the CompuServe Information Service. In doing this, however, the user will incur the additional charges nominally computed by CIS at the rate of \$5.00 an hour.

Users shall have unlimited access to ATARI CENTRAL during non-prime hours (6:00pm to 7:00am local time) for the fixed monthly fee. Special arrangements shall be available for limited access during prime time.

The benefits of a subscription-based accounting scheme are manifold. It greatly simplifies billing, auditing, and other record keeping activities. It allows both ATARI, Inc. and CompuServe to project revenues more accurately.

The first-level menu of ATARI CENTRAL shall offer the following choices:



Each of these options contain a set of services and sub-menus described in subsequent paragraphs.

3.2.1.1 ATARI Village



'ATARI Village' is the portion of the system that is operated, moderated, and literally shaped by the user community.

Membership Profiles: A directory of ATARI CENTRAL members, including location, interests, hobbies, and equipment owned. This file shall support a keyword-search facility. At a later stage of development, this file will also contain a GTIA 'picture' of each member who chooses to send a photograph along with their subscription fee.

Electronic MAIL: A facility to allow private messages to be sent among members. Members can also use this area to obtain a list of users currently in ATARI CENTRAL and 'page' them for a two-way, real-time conversation. At a later stage, mailing lists, mail forwarding, and mail certification will also be supported. Also, members will use Electronic MAIL to communicate with other users of CompuServe who do not subscribe to ATARI CENTRAL.

ATARI Forum: A public bulletin board, or notes file. Messages placed in this area can be read, and responded to, by any member of ATARI CENTRAL. Notes shall be organized by topic-matter in the form of "threads." Each thread consists of a base note and a series of replies. Users shall be able to scan this area for messages of particular interest. Also, members shall be able to post private messages when addressing an individual member.

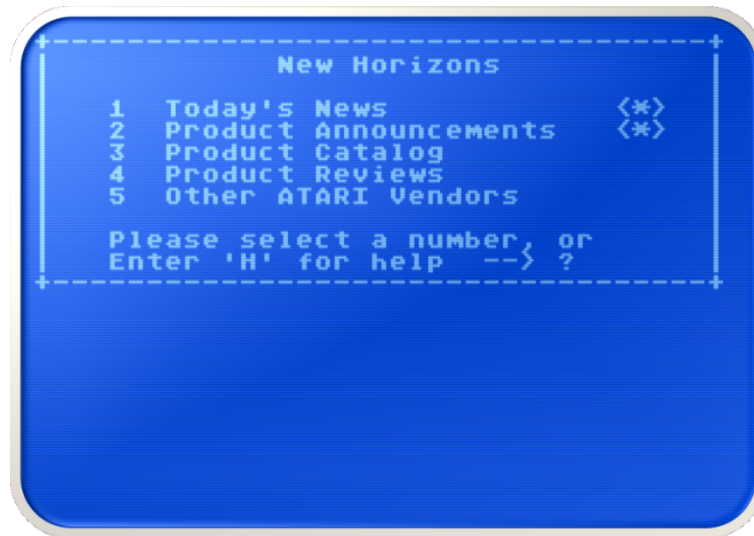
The Party Line: A multi-channel, real-time conferencing facility. This program allows any number of members to simultaneously converse with each other. Typically, members will prearrange a time to meet here via Electronic MAIL or via messages left in the Forum.

Software Library: A collection of member-contributed, public domain software. These programs can be downloaded over the phone lines directly to disk for later execution. The library shall also maintain short descriptions of each of these files that can be searched by keyword.

Members wishing to add to this library will upload their program into a "holding area." After ATARI CENTRAL personnel review these programs for eligibility, they will be made available to the membership-at-large. This area shall also contain a library of useful, general-purpose subroutines supplied by ATARI CENTRAL staff.

User Group Information: A list of ATARI User Groups around the country. Members can search this file to locate a group nearby.

3.2.1.2 New Horizons



'**New Horizons**' will be updated by ATARI CENTRAL personnel on a periodic basis to reflect the current state of hardware and software available to ATARI users.

Today's News: A quick look at the latest additions/changes to ATARI CENTRAL. This news file shall retain announcements for a period of four weeks.

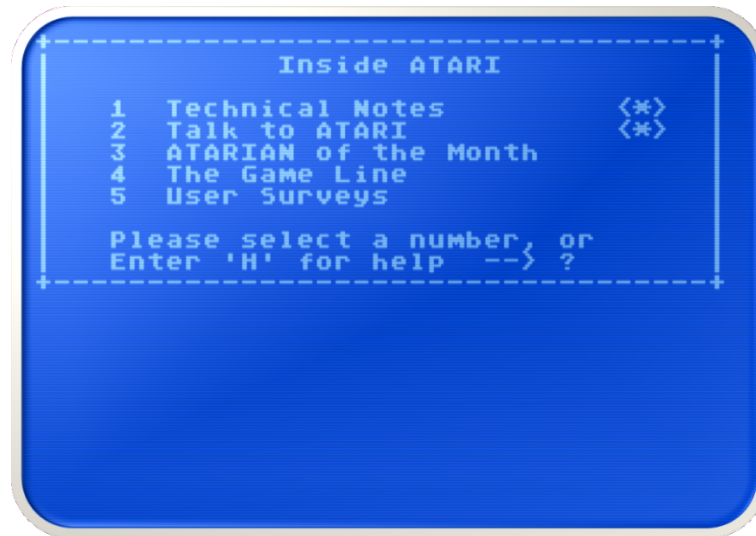
Product Announcements: A dataset of new product bulletins and availability dates. As these items are announced to the public in other media they will be simultaneously announced here.

Product Catalog: An online form of the most-current ATARI products catalog.

Product Reviews: A collection of member-written product reviews. Members will submit unsolicited product reviews in the same fashion as user-contributed programs; that is, ATARI CENTRAL staff retain final approval authority before these reviews are posted.

Other ATARI Vendors: An online catalog of ATARI-compatible products offered by other suppliers.

3.2.1.3 Inside ATARI



'**Inside ATARI**' provides the membership with a direct channel of communication back to the company. It should provide a glimpse, perhaps even a humanist perspective, of life in the "corporate megalith."

Technical Notes: A collection of articles authored by ATARI software specialists on various technical topics. These articles shall be similar in scope and length to those now being prepared in house for "Bits & Bytes" and ATARI I/OCB.

Perhaps the programmer of a popular ATARI computer game, say, for example, Donkey Kong, could describe the implementation process, technical hurdles overcome, and even supply playing tips. This database shall be keyword indexed.

Talk to ATARI: A method for members to send messages directly to ATARI CENTRAL personnel. Using the 'Electronic MAIL' mechanisms in the system, users will be able to submit private communications to the operators of ATARI CENTRAL.

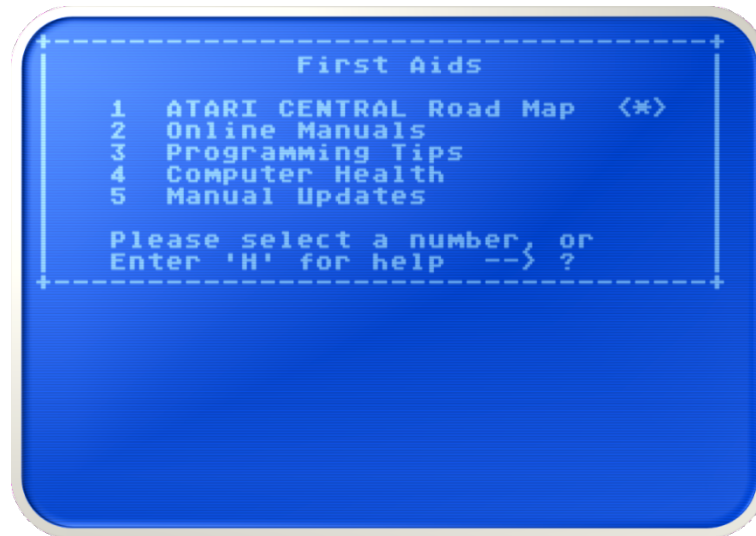
These messages may contain technical questions, comments on ATARI CENTRAL, or feedback on ATARI products. ATARI CENTRAL staff shall attempt to reply to these messages, via Electronic MAIL, within three working days.

ATARIAN of the Month: A profile of a Home Computer Division software or hardware engineer. This monthly feature will allow the membership to learn something about the people behind the products. In fact, in addition to the interview-style format of the text, users will be able to display a GTIA 'photograph' of the designer.

The Game Line: Product announcements from other ATARI divisions. As new coin-op and consumer games are readied for market they will appear here along with availability dates and, perhaps, playing tips.

User Surveys: A series of questionnaires designed to provide us with (possibly) valuable market feedback. Results of these surveys should be made available to the membership at the end of each recording period.

3.2.1.4 First Aids



The '**First Aids**' station provides a general-purpose troubleshooting guide for novice and expert members alike.

ATARI CENTRAL Road Map: A comprehensive guide to navigating the world of ATARI CENTRAL. This database will describe the tree-structured nature of the information available within the system.

It shall also contain a cross-referenced index of all information and services in ATARI CENTRAL with instructions on directly accessing a desired entry. At a later stage, members will use this area to create personalized routers and menus, tailoring the interface to their needs.

Online Manuals: Computer-based versions of ATARI technical manuals. Members shall have access to manuals on a menu and keyword search basis.

The first manual to be offered in this manner shall be the 800/1200 Technical Notes. It is already in machine-readable, indexed form.

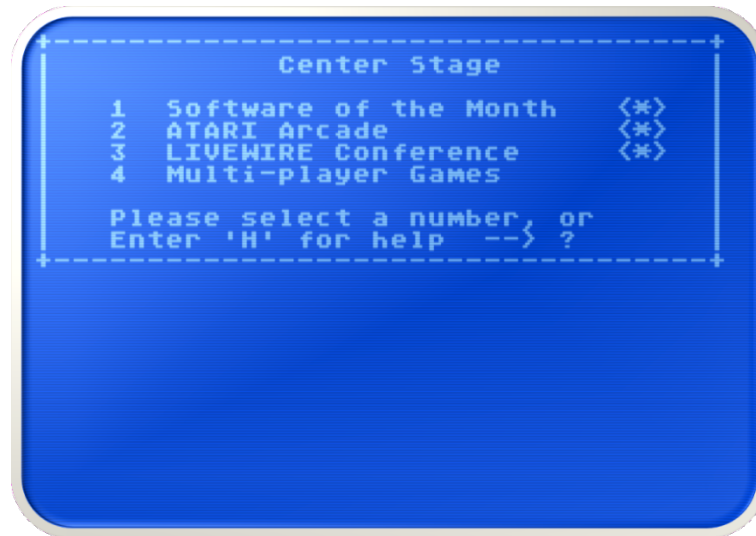
Later in the evolution of ATARI CENTRAL, other manuals shall be brought online to support our language products. The host software required to support this service is already in place, in that CompuServe currently offers the entire World Book Encyclopedia on a keyword search basis. This unique feature of ATARI CENTRAL will, for many members, justify the subscription cost alone.

Programming Tips: A collection of downloadable demonstrations and programming examples. This database provides members with specific guidance in technical matters by showing how an effect is accomplished in actual source code. These examples shall be cross-referenced to the online manuals. The method used to download the programs is the same as that for the public domain programs.

Computer Health: A set of aids for troubleshooting and diagnosing possible home computer hardware problems. This database shall contain the traditional, textual "what if" presentation as well as downloadable diagnostic routines. It shall also contain a summary of the basic "do's and don'ts" to keep in mind when handling computer equipment and storage media.

Manual Updates: A collection of print ready errata sheets for all ATARI manuals.

3.2.1.5 Center Stage



'Center Stage' is the heart of ATARI CENTRAL. It should provide the compelling reasons to draw new subscribers into the system, and cause current members to regularly renew. It shall be refreshed monthly with all new material.

Software of the Month: A collection of premium programs produced by ATARI (or a contractor) expressly for distribution via ATARI CENTRAL. Offering perhaps five programs a month, members will be able to download these directly to their own diskettes. There shall be no additional charge for these programs above the monthly subscription fee.

ATARI Arcade: A collection of game programs for download to execution only. Unlike the 'Software of the Month' category, these programs shall not be sent in a manner that allows permanent storage by the user. Instead, the binary image will be encrypted as it is sent to the terminal. After the game has been transmitted, the user will terminate his session on ATARI CENTRAL, "hang up" the telephone, and press the START key on his computer to begin execution of the game.

There shall be three of these programs available each month. Members will be able to display or print a one-page description/instruction sheet prior to receiving the file.

LIVEWIRE Conference: An opportunity for members to participate in a real-time conference with a nationally-known personality. Similar in operation to the 'Party Line' facility, this event will allow members to submit questions to the guest on a special channel and receive the answers on a channel broadcast to all viewers.

Guidelines for subject matter and question selection will be predetermined by the membership prior to the three-hour conference. The conference itself will be 'moderated' by ATARI CENTRAL staff.

Possible candidates for guests would be Walter Cronkite, Arthur Clarke, Leonard Nimoy, one of the shuttle astronauts, ... the list is endless. Initially, this event should occur on a monthly basis. As membership rolls grow, it could be performed once a week.

Multi-player Games: A collection of real-time gaming activities designed to be executed on ATARI computers using ATARI CENTRAL. These games will be designed so that members can enter and exit over a period of several days, still working toward a common, team objective. Perhaps, as this facet of ATARI CENTRAL develops, prizes can be awarded in the form of lower subscription fees.

3.2.2 ATARI CENTRAL Terminal-resident Software

ATARI CENTRAL shall be available to all interested parties, even to people without ATARI computers. However, these users will only have access to a subset of services and features.

In order to take full advantage of the system, members will use a new communications program for the ATARI, perhaps to be called "ACTOR" (for ATARI CENTRAL Terminal ORganizer.) The functional requirements for this program are listed below.

NOTE: Many of these features have been implemented to varying degrees in other software products, such as TELELINK II, The ATARI Executive (ATEX), and LIZARD. The development and implementation effort may involve investigating the use of software modules from these programs.

In any case, the resulting software product (ACTOR) shall be appropriate for use in any telecommunications environment, and will address market needs outside of the ATARI CENTRAL framework as well.

3.2.2.1 Peripheral Support

Telecommunications Equipment:

- ATARI 835/1030 DCM with Autodial <*>
- ATARI 850 Interface Module (110-9600 bps) <*>

Printer Support (ATARI 825/1025 family of 80 column printers):

- "Simultaneous" printing (a la TELELINK II) <*>
- "Simultaneous" printing direct to printer only <*>
- Local keypress for Full Screen Print <*>
- Selection of device "P:" as target for download <*>

3.2.2.2 Terminal Configuration Controls

Multiple Service Descriptors (Saved on Disk):

- Service Name (i.e. ATARI CENTRAL, SOURCE) <*>
- Telephone Number <*>
- Auto-logon Information <*>
- Function Key Assignment Link (i.e. DOS filename) <*>
- Terminal Configuration Link <*>

Multiple Terminal Configurations (Saved on Disk):

- Terminal Emulation Mode (VIDTEX default) <*>
- Line Length (37 to 134 columns) <*>
- Left Margin (0 or 2) <*>
- Communications Device (R1: - R4:, or T:) <*>
- Baud Rate (110 – 9,600) <*>
- Parity (Even, Odd, Strip, None) <*>
- Duplex (Full, Half, or Local) <*>
- Answer or Originate Mode <*>
- Flow Control (DC1/DC3, Echo, or None) <*>

Additional terminal emulation modules downloadable

3.2.2.3 File Transfer Protocols

The local software shall initially support four file transfer methodologies. These shall be:

- ASCII buffer capture/upload (non-blocked) <*>
- Christensen (XMODEM) Protocol <*>
- CompuServe 'B' Protocol <*>
- CompuServe 'L' Protocol <*>

ASCII Buffer Capture: A host or locally triggered state permitting local storage of all ASCII characters received by the terminal. Uploading of coded (ASCII) files into line-oriented editors can also be achieved with this feature.

Christensen Protocol: A de-facto file transfer standard in the microcomputer industry. The terminal emulation software shall support this standard in order to enable transferring files between various models of personal computers.

CompuServe 'B' Protocol: A well-defined file transfer standard with a large base of existing host software already in place. The ATARI CENTRAL software shall use this protocol for most of the file transfer activities.

The specific 'B' Protocol functions to be supported are:

- Read Data:
 - Read a character
 - Read a line terminated by CR
 - Read contents of page n from HOME to cursor location
 - Read contents of page n from HOME to end of page
- Load Display Page n
- Display (show) Page n
- Load Character Set
- Data Encryption
- Data Compression
- Interrogate Remote Terminal

- Upload or Download File:
 - ASCII file
 - Binary file
 - Compressed ASCII file
 - Image (ATARI CENTRAL dependent) file
- Host and Local Access to ATARI FMS:
 - Initialize diskette
 - Catalog diskette (directory)
 - Rename file
 - Delete file
 - Copy file
 - Append to file

CompuServe 'L' Protocol: Provides a mechanism for patches and offline programs to be loaded into the terminal for subsequent execution.

3.2.2.4 Graphics Control Protocol

The local software shall support a number of host-controlled graphic command sequences. Many of these sequences are supported by current "VIDEOTEX" compatible software products (ATEX) and the local software developed for ATARI CENTRAL shall adhere to the standards set forth in applicable document 2.7 for the following graphic functions:

- Relative Cursor Movement <*>
- Absolute Cursor Positioning <*>
- Graphics Mode Control
 - Semi-graphics 4 <*>
 - Medium-resolution graphics (128 x 96 pixels)
 - High-resolution graphics (256 x 192 pixels)
- Enter Normal (text) Mode <*>
- Home Cursor <*>
- Clear to end-of-page <*>
- Clear to end-of-line <*>
- Clear Display <*>
- Set Alternate Text Colors
- Set Alternate Graphics Colors
- Disable Display <*>
- Enable Display <*>

In addition to the above, the ATARI CENTRAL terminal software shall support the following hardware-specific graphics functions:

- Send Display List
- Select Alternate Display List
- Send Graphics Mode Line
- Select Alternate Character Set <*>

3.2.2.5 Additional "Creature Comforts"

- Single-key Macro Definitions <*>
- Mini-Editor
- Split Screen Display <*>
- Real-time Clock

Single-key Macro Definitions: A mechanism allowing often-used command sequences to be assigned to a single keystroke combination. The local software shall provide a facility for the user to use the Mini-editor to create disk files containing these macro definitions.

The "service descriptor" file shall contain a pointer to the appropriate macro definition file for that service. Also, macro definitions may be assigned to any of the joystick positions. The 'red button' on the joystick shall be used as a carriage return (for verification) when macros are assigned in this fashion. If a macro transmission is not pending from the joystick, then the 'red button' shall act as a pause key, alternately sending an ASCII DC1 and DC3.

Mini-Editor: A limited-function text editor for use when online. The communications software shall support an ASCII character editor that can be invoked while communications is ongoing.

While this editing mode is active, there shall be a communications window of four lines at the top of the screen concurrently displaying any data received over the line. Also, the editor shall support a "read-only" mode for perusal of existing disk files.

Split Screen Display: A locally-controlled option allowing the user to open a window of four lines at the bottom of the display to prepare an input record for transmission.

This feature allows the user to build an ASCII record using the cursor-movement keys and screen editing functions. Upon pressing RETURN, the entire record shall be transmitted to the host.

Real-time Clock: A time-of-day display presented locally at the user's request. The user shall be able to set this clock, or the host software shall be able to transmit the current time to perform this function automatically at sign-on. The display's presence shall not obscure information already on the screen. The user shall enable or disable this display with a local keystroke. Also, once this clock has been set, the user may set an alarm to be triggered locally at a requested time.

3.3 Performance Requirements

3.3.1 Response Time

The ATARI CENTRAL system shall operate in a "full duplex" environment, therefore, the actual response time experienced by a user will largely depend upon the network data path and current network loading conditions.

The time required to echo a single keypress shall be no longer than 5 seconds under worst-case network loads. The host software shall respond to user requests within ten seconds of receipt. The terminal emulation software shall respond to local requests within three seconds.

Ideally, as network loading conditions begin to degrade the system beyond the constraints set forth above, both ends of the system should automatically take action to mediate the effect on the user.

There are a number of technical approaches that can be used in anticipation of this problem, all of which are beyond the scope of this document.

3.3.2 Capacity

The success of ATARI CENTRAL depends on the ability of the host to support a large number of simultaneous users. Current technology in operation at CompuServe allows a maximum of 600 simultaneous users. The minimum number of simultaneous users supported by any incarnation of ATARI CENTRAL shall be 300.

The local software shall support a maximum of 20 "service descriptor" files, and 20 "terminal configuration" files on the telecommunications program disk.

3.4 Design Requirements

Initially, it is anticipated that ATARI CENTRAL will be brought up on computers operated by CompuServe, Inc.

Both the host software and local software developed in conjunction with this project should be designed with transportability to other mainframe environments in mind. We have currently active agreements with CompuServe authorizing ATARI, Inc. to use the 'B' protocol on other mainframes.

The ATARI CENTRAL software shall conform to the standards set forth in the Software Development Committee Report and adhere to the guidelines of the ATARI Human Factors Checklist.

3.5 Packaging Requirements

The communications software shall initially be released in disk form, with a follow-up cartridge.

An "ATARI CENTRAL Operator's Guide" and a Quick-reference Card shall be developed for release with the software. Also, a free one-month subscription shall be offered within the package.

3.6 Special Requirements

Research activities must be undertaken to investigate software security issues. The most sensitive data transmissions will occur during use of the 'ATARI Arcade'.

Special attention must be given to developing a secure, readily-modifiable, "handshaking", encryption scheme for use in this service area.

The national "roll-out" of ATARI CENTRAL should be accompanied by appropriate print and broadcast media advertising campaigns.