

INSTRUMENT CONTROLLER

1722A

1722A With Keyboard

1722A Instrument Controller

- Microcomputer architecture designed for system control
- Touch display operator interface
- BASIC, FORTRAN, and Assembly programming language options
- Rack mountable with removable keyboard
- 136K RAM memory expandable to over 2.6 megabytes
- High resolution graphics with graphics print capability
- RS-232-C, IEEE-488, RS-422, or 20 milliampere current loop and bit parallel interfaces
- High speed floating point processing implemented in firmware
- Soft-loaded operating system

The 1722A represents the evolution of a concept pioneered and introduced by Fluke in 1980—the concept of using a touch-sensitive CRT display as the primary interface between an operator and a high-performance instrument controller. Few things could be more user-friendly. And it allowed the keyboard to be treated as a programming tool, usually unplugged and removed from an operating instrumentation system. Rack mounting was simple.

Fluke's first instrument controller was the 1720A. The 1722A has improved capabilities. But, because we are committed to maintaining the highest possible level of software compatibility consistent with evolutionary improvements, the 1722A runs programs that were developed for even the first 1720As delivered. As we continue to develop microcomputer products at Fluke, the software investments made by our customers remain a foremost design consideration.*

High Performance Microcomputer

The 1722A, is a microcomputer designed for control of automated instrument systems in the laboratory, the plant, or the factory and for information management systems.

The 1722A is an entirely new design internally. The high speed 16-bit microprocessor uses a 24 MHz clock to achieve an instruction cycle rate of 6 MHz. High-speed floating point arithmetic processing is implemented through extensions to the microprocessor instruction set. A separate display processor, with high speed vector generator and graphics memory workspace, functions as an independent graphics display terminal for the central processor.

When powered on, the 1722A looks to its internal floppy disk (or to optional internal bubble memory) for operating software. Updating to newer software is a simple matter of inserting a disk and restarting. You are not tied to permanently-installed ROMs. Yet the 1722A is easily set up to automatically start running your application. After loading operating software, it looks for a start-up command file. The file is treated as keyboard inputs, instructing the controller to perform any task sequence. If software is stored in optional non-volatile bubble memory, you never need to bring a disk near it.

RAM memory in the 1722A can be partially allocated as a file-structured electronic disk, for high speed task overlays and large, fast-access virtual data arrays. Software development tools make the task of writing programs more efficient through such features as wildcard file identification, utility command files, and recall of previously typed commands.

The 1722A includes five slots for additional memory and interface options. The standard 136K RAM memory is internally expandable to

* The 1720A and 1722A have been incorporated into a number of Fluke calibration systems. See pages 131 through 146.

INSTRUMENT CONTROLLER

1722A

over 2.6 megabytes. The 400K-byte internal floppy disk drive capacity can be expanded through the 1760A or 1761 Disk Drives to 2 megabytes of on-line floppy disk file storage. The 1765A/AB Winchester Disk Drive System brings 10 megabytes of file capacity on-line. And bubble memory options can be installed for up to 1.3 megabytes of rugged, non-volatile file storage especially well suited for harsh environments.

Touch-Sensitive Display System

With its touch-sensitive display, the 1722A is particularly well suited for applications where semi-skilled personnel need to operate complex systems performing sophisticated tasks. The friendly graphics display takes the place of the often-intimidating keyboard, yet offers access to the software that keeps your system running. An operator is prompted one step at a time for information or decisions through informational displays, and responds by simply touching the screen. The predictability of procedures allows true trend analysis to be performed, pinpointing common failure modes or process impediments. Systems based on this concept are easily updated for new tasks. The cost and downtime of installing new switch or key labels is eliminated.

Fluke's experience producing the touch-sensitive display overlay goes back to 1980. It has proven to be a rugged, reliable component.



Touch-sensitive interactive display

Characters Plus Graphics

The graphics display capability of the 1722A is independent of its character display, and of the 1722A central processor. With its own display processor, high speed vector generation hardware, and 64K graphics display memory, the 1722A is a sophisticated tool in the hands of the creative system designer. The 64K display workspace is over three times the size of the 640 by 224 pixel display window: 2048 pixels wide by 256 pixels high. You can use it to display data in strip chart form, and move the display across the window by touch commands. You can also use it to prepare up to three independent data screens available for instant display. Once the graphics display is generated, a hard copy of the graphics plane can be printed under program control.

The 1722A character display is an independent function that can overlay graphics data displays for labels, or be used alone for text and for programming. Because the graphics and character displays can be independently enabled, screens can be prepared "off-line" and displayed when ready. Numerous ANSI-compatible character attributes are available to add emphasis to portions of displays. Attributes such as inverse or underline can be pre-defined for display fields, or made a part of characters as they are sent to the screen.

The 1722A includes an industry standard composite video output that will display whatever is on the 1722A screen on a video monitor. This can be useful for training presentations as well as for system requirements that include a remotely mounted display.

Interfacing

The 1722A includes an IEEE-488 bus interface port and an RS-232-C serial port. The IEEE-488 interface can control up to 14 instruments at transfer rates of up to 30K bytes per second. Powerful IEEE-488 commands are supported as a part of each 1722A programming language. The 1722A can be set up to function as a system controller or as an addressable device in a multiple-controller system. In either configuration, the 1722A can pass control to another controller and take it back when offered. As system controller, the 1722A starts up as controller-in-charge and can use IFC (Interface Clear) to reset all bus devices.

Three of the five expansion slots are available for additional interfaces:

Option 17XXA-008 adds an additional IEEE-488 interface and an additional RS-232-C serial data port. The 1722A can accommodate up to two IEEE-488 ports.

Option 17XXA-009 is a reconfigurable, dual serial port with its own buffer memory. It is supplied configured for RS-232-C with full modem compatibility. Each port can be easily reconfigured for a 20 milliamp current loop, or for RS-422 balanced lines. Up to three -009s may be installed for a total system of seven serial ports.

Option 17XXA-002 (Parallel Interface) gives you two independent 16-bit parallel I/O ports that can function as independent lines, 8-bit bytes, or 16 or 32-bit words. Line protocol is available (but not required), and the sense of the data can be reconfigured to either High true or Low true. A maximum of three modules may be installed for a total of six 16-bit ports.

Options & Peripherals

RAM Expansion Modules (-006, -007)

The internal program and data space can be expanded to over 2.6M bytes with RAM expansion modules. These modules can be added in either 256K or 512K byte increments. Your software can easily assign part of the RAM memory to perform an "electronic disk" function. Once programs are downloaded from floppy-disk drive, the 1722A may run using only the electronic disk.

Bubble Memory Options (-004, -005)

The -004 and -005 options are bubble memory boards that provide either 256K (-004) or 512K (-005) bytes of file storage. The transfer rate is 25K bytes per second.

Bubble memory is solid-state medium which is immune to pollution and vibration, making it ideal for harsh environments where floppy disk operation is not practical. Bubble memory is nonvolatile, so it does not require battery back-up to retain its file contents through a power loss. Since bubble memory has a much greater tolerance to temperature extremes than other media, the 1722A can operate from 0°C to 40°C when bubble memory is the primary file storage medium.

External Floppy Disk Drive Systems (1760A and 1761A)

The Fluke 1760A Disk Drive and 1761A Dual Disk Drive each provide high capacity floppy disk file storage. The 1760A and 1761A use double-density dual-head disk drives. The full on-line capacity is 400K bytes for the 1760A, and 800K bytes for the 1761A, including a file directory for each floppy disk. They interface to the 1722A via the IEEE-488 port. Both systems are rack mountable and easy to install and use. Transfer rate is 22K bytes per second. Up to two 1761As can be accommodated, for a total of 2M bytes of on-line floppy disk file space.

Winchester Disk Drive (1765A/AB)

The 1765A/AB is a 5¼-inch Winchester Disk Drive that provides 10M bytes of mass file storage when used with the 1722A. It interfaces to the 1722A via the IEEE-488 port. Transfer rate is 22K bytes per second.

Software

For information regarding 1722A Software, see the following "Software" section.

INSTRUMENT CONTROLLER

1722A

Module-Level Diagnostics

The 1722A is a modular design with diagnostic software that allows semi-skilled operators to identify failures to the module level. Spare-module kits are available for the most time-critical applications. Fluke also maintains an inventory of 1722A modules that may be shipped within hours in most cases, and which can be exchanged for a defective module for a nominal charge. Contact your Fluke Technical Service Center for more information.



Manuals That Make the Task Easy

Experience will tell you that the major investment in an automated instrument system is not in the hardware, but in system integration and the development of application software to run it. The quality of documentation is a key consideration. You will find that 1722A manuals are among the most readable, consistent, and sensible software documentation available anywhere. Ask your Fluke Sales Engineer or Representative to let you evaluate the 1722A through its manuals. You will be pleasantly surprised.

OEM Sales — 1722A in Your Products

The 1722A is used as a component part of many products manufactured by companies other than Fluke. Custom packaging and matching paint colors are routinely negotiated. Fluke offers the discounts, policies, and worldwide support to make it work, too. If you are designing a product that would be more competitive with a touch-sensitive graphics display and a high performance microcomputer system, call your Fluke Sales Engineer or Representative for more information.

Specifications

Temperature: 10°C to 40°C with floppy disk, operating; 0°C to 40°C without floppy disk, operating. 10°C to 52°C with floppy disk, non-operating; -20°C to 60°C without floppy disk, non-operating

Relative Humidity: 20% to 80%, non-condensing, operating; 8% to 90% non-condensing, with floppy disk, non-operating or 5% to 95%, non-condensing, without floppy disk, non-operating

EMI and RFI Emissions: Tested to FCC Part 15, Subpart J, Class B; VDE 0871, Class B; CISPR 11-1975

Power: 90V to 132V ac or 180V to 264V ac, 47 Hz to 440 Hz. 175W maximum

Size: 13 cm H x 43 cm W x 55 cm L (5.25 in x 17 in x 21.5 in) plus feet

Weight: 14.5 kg (34 lb). Keyboard 1.4 kg (3 lb)

Included: Y1700 Keyboard, power cord, BASIC system disk, diagnostic disk, "Getting Started" manual and disk, System Guide manual, Operator's manual, BASIC Programming Manual, and a pad of 50 display worksheets

Model

January 1986 prices

1722A Instrument Controller	\$6400
1722A-1 Instrument Controller w/o Keyboard	6200

Options*

17XXA-002 Dual 16 Bit Parallel Interface	790
17XXA-004 256K Bubble Memory	3250
17XXA-005 512K Bubble Memory	5450
17XXA-006 256K-Byte RAM Expansion	1000
17XXA-007 512K-Byte RAM Expansion	1400
17XXA-008 IEEE-488/RS-232 Interface	590
17XXA-009 Dual Serial Interface	850
17XXA-201 Assembly Language Software Development System	1495
17XXA-202 FORTRAN Software Development System	1495
17XXA-203 Compiled BASIC Software Development System	490
17XXA-205 Extended BASIC Software Development System	490

*All options are customer installable

Peripherals

1760A 400K Byte Disk Drive	1950
1761A 800K Byte Dual Disk Drive	2950
1765A/AB 10M Byte Winchester Disk	4250
1780A InfoTouch® Display	1995

Accessories (Also see page 230)

Y1700 Programmer's Keyboard	395
Y1702 2m RS-232-C Null Modem Cable	125
Y1703 4m RS-232-C Null Modem Cable	150
Y1704 Circuit Board Extender	200
Y1705 0.3m RS-232-C Null Modem Cable	75
Y1706 Double-Sided Blank Disks (package of 10)	100
Y1707 2m RS-232-C Interface Cable	125
Y1708 10m RS-232-C Interface Cable	150
Y1709 2m Printer Cable	125
Y1711 Shipping Case	300
Y1790 Rack Mount Kit with 24" Slides	175
Y1795 Carrying Handle for portability	48
Y8021 1m Interface Cable for IEEE-488 bus	85
Y8022 2m Interface Cable for IEEE-488 bus	95
Y8023 4m Interface Cable for IEEE-488 bus	105

After-Warranty Service (See page 227)

A full range of service and support agreements is available for this product. See page 227 for instructions on obtaining prices for Fluke maintenance, calibration, training, and consulting programs.

1700 SERIES SOFTWARE

1700 Series Software

The power of any computer system lies in the software that is supported with the system. The 1722A Instrument Controller and 1752A Data Acquisition System support a variety of software development systems, utilities and applications packages. Each package is designed to help the programmer develop software to fit the system to his particular application. Fluke also offers training and consulting services to help get your system up and running in the shortest possible time.

System Software

Fluke's FDOS operating system combines the best features of both benchtop computers and minicomputers. Like a benchtop unit, the user can power-up the system and immediately begin programming in BASIC. No further knowledge of the operating system is required. For the advanced programmer, powerful utilities allow the user to perform complex functions with a minimum of keystrokes. Features include:

File Utility Program — Simplifies management of file structured devices such as the floppy disk, or bubble memory. Its concise, simple commands allow the user to transfer the contents of files or whole disks with a single command. Other features include wildcards, interactive commands, and file protection.

SET — Allows software set-up of serial port communications parameters, including baud rate, timeouts, and XON/XOFF handshaking.

Alias File — Allows the user to define his own commands for the system.

Command Files — Allows the user to define command sequences for the system. Flexible features allow the user to develop interactive sequences which can interface with the operator through either the keyboard or the touchscreen. Command files may also be used to automate the controller's start-up sequence.

TCOPY — The touch copy utility allows the user to perform file management through the touchscreen. It allows copying of files by name, date of creation, etc.

EDIT — The system editor is a powerful screen editor, with capabilities for searching, replacing, and cut-and-paste.

SHELL — The user may set the default console program with the SET SHELL command. This allows the programmer to design a system where his application program is the only software that the operator can see.

Other utilities allow the user to configure the operating system, check compatibility between various versions of software, and set the time and date through the touchscreen.

BASIC

The 1700 Series supports three BASIC packages. Compiled BASIC and Extended BASIC are available as options. Each package provides the programmer with the development tools necessary to take on the task of developing industrial control systems.

Compiled BASIC

The 17XXA-203 Compiled BASIC Option provides greater flexibility and speed while maintaining the ability to compile Fluke Interpreted BASIC. Programs can be run three to five times faster with Compiled BASIC than with Fluke Interpreted BASIC, while using less memory. Compiled BASIC includes the capability of linking subroutines in FORTRAN or Assembly Language.

Compiled BASIC permits large multiple-line statements, and long descriptive variable names. It also permits labels to be used in place of line numbers for branch targets while leaving the use of line numbers optional. Compiled BASIC subroutines exchange parameters, and use local variables and common variables for true modularity. This freedom of format allows BASIC programs to be written in a readable, structured form. Multiple-line statements can be especially useful, for example, when a program requires many lines following an IF statement. Key features include:

- Program execution 3 to 5 times faster
- True subroutines with local variables
- Use of program overlays for large programs
- Three dimensional arrays
- Alphanumeric labels for lines and/or statements
- Long variable names
- Continuation lines — up to 200 lines per line number
- Powerful screen editor

Extended BASIC

The 17XXA-205 Extended BASIC Option provides a compiler that allows the 1722A programmer to easily develop large BASIC programs without having to use a complex overlay structure that can be required when using Fluke Compiled BASIC. (Program space can be over two megabytes.) The statements and syntax are the same as those found in our Compiled BASIC. Key features include all those mentioned for Compiled BASIC except execution speed is only twice as fast as Fluke Interpreted BASIC, while eliminating complex program overlays.

Comparison of Fluke BASIC Offerings

Feature	Interpreted BASIC	Compiled BASIC	Extended BASIC
Program Size	28K bytes	35K bytes	>2M bytes
Execution Speed Ratio (approximate)	1	3-5	2
Program Expansion Method	Chaining	Overlays	None required
Immediate Mode Commands	Yes	No	No
3-D Arrays	No	Yes	Yes
Continuation Lines	No	Yes	Yes
Long Variable/Statement Names	No	Yes	Yes
True Subroutines	No	Yes	Yes
Program Libraries	No	Yes	Yes
Option To Omit Numbers	No	Yes	Yes
Input Line Statement Capacity	80	510	510
Import/Export Statements (Global Variables)	No	No	Yes
Step Mode Debugging	Yes	No	No

FORTRAN

The Fluke 17XXA-202 offers a complete system for development of FORTRAN programs or subroutines with performance rivaling many minicomputers. Fluke FORTRAN makes it easy to use the features of the 1700 Series. Libraries provide routines for numeric and text manipulation, touchscreen and graphics support, and communications, including IEEE-488. Fluke FORTRAN can also interact with the operating system to provide functions such as file management and interaction with the system's command line interpreter.

Typical Statement Execution Times

	BASIC	Compiled BASIC	FORTRAN
Math Functions Execution Time, msec*			
= (Assignment)	0.460	0.152	0.004
+	0.474	0.353	0.237
—	0.477	0.353	0.224
*	0.506	0.383	0.209
/	0.682	0.554	0.221
^	4.821	4.652	2.902
SIN	2.301	2.052	1.332
COS	2.431	2.202	1.242
TAN	4.771	4.512	2.802
ATN	3.361	3.122	1.422
SQR	1.611	1.382	0.842
LOG	2.351	2.112	1.462
LN	2.461	2.222	1.542
EXP	2.411	2.172	1.512
Control Statements			
FOR Loop (integer counter)	0.189	0.076	0.004
IF-THEN	0.622	0.121	0.110
GOSUB/RETURN	0.254	0.142	0.036

*Data may vary depending on application

Assembler

The 17XXA-201 allows the programmer to develop high speed or specialized routines in assembly language. The package includes a structured preprocessor which allows the use of high level constructs for program flow control. Using Macrostore™, double- and single-precision floating point arithmetic instructions become part of the language, simplifying code development. Also provided is the Hex Debugging Tool (HDT), with disassembly capability to speed program development.

C

The 1722A C Development system features a modified implementation of Whitesmiths™ C. This complete implementation of C supports features such as user defined data structures, full compliment of math functions, bit fields, and string manipulation routines. For real-time and instrument control applications, the system supports a full complement of interrupt processing structures, IEEE-488 I/O commands, and a complete interface to the FDOS operating system. This package requires the purchase of the 17XXA-201 Assembly Language Development System. Contact your local Fluke representative for more information.

FlexSys Test Software (ATLAS)

To speed development and reduce software maintenance costs of test systems, the ATLAS language is available for the 1722. More information is available in the following FlexSys section.

Linkers and Library Management

Linking and Library Management utilities are provided standard with the following software packages:

- 17XXA-201 Assembly Language Development System
- 17XXA-202 FORTRAN Development System
- 17XXA-203 Compiled BASIC Development System
- 17XXA-205 Extended BASIC Development System

Fluke's Linking programs allow the user to modularize his program, by compiling routines one at a time, and then linking the final software package. This simplifies the management of projects requiring multiple software engineers. Support for overlays is offered through the Linkage Editor. The Library Manager may be used to build libraries of user defined routines.

Gabby

The GABBY Terminal Emulation Program (17XXA-901) is a communications program which provides a simple method of transferring files to and from almost any host computer. GABBY emulates a terminal attached to the host computer and also allows uploading and downloading of files between the 1700 Series and the host computer. With GABBY, all commands are accessed through the touchscreen, relieving the user from the task of learning cryptic command sequences.

Touchscreen Toolbox

Fluke's expertise in developing human interfaces using the touchscreen is made available to the programmer through the 17XXA-902 Touchscreen Toolbox package. The package cuts the time required to develop a menu based system, while ensuring that the resulting menus will be simple for the operator to use. The package also includes calculator-style and alphanumeric keypads to simplify the tasks of entering data such as process control parameters, operator identification, or serial numbers.

MBASIC (available early 1986)

MenuBASIC (MBASIC) is a tool designed to simplify the task of developing programs for Fluke Controllers. It provides access to a powerful BASIC language, complete with advanced structures such as CASE statements and true subroutines, and features designed to simplify systems development such as full IEEE-488 support and multi-level interrupt structure. MBASIC also features a powerful editor which can search, search and replace, and merge programs interactively.

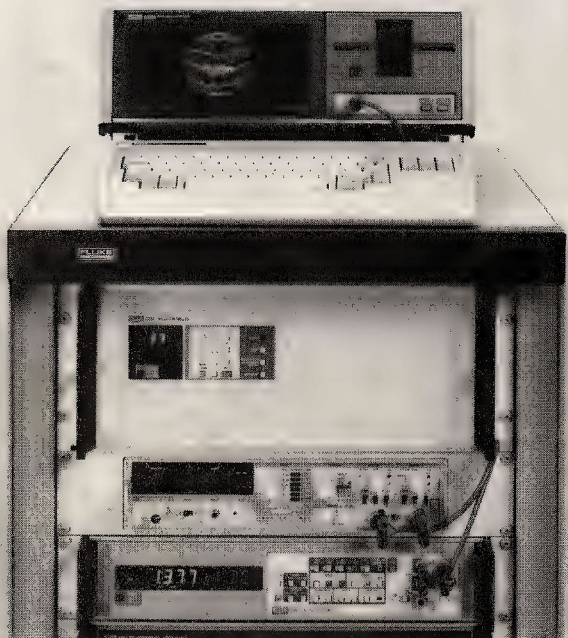
MBASIC makes these and other features easy to use by allowing the programmer to select actions from a menu presented on the screen. It is not required that the programmer memorize the commands, since they are displayed on the screen as part of the menu. This makes learning how to use MBASIC a simple task, as well as allowing single key commands to perform functions which require long command strings on most systems.

MBASIC features include:

- **BASIC Language:**
 - Full IEEE-488 Support
 - Multiple-Level Interrupt Structure
 - Virtual arrays
 - Line Numbers Optional
 - True Subroutines with local variables
 - Long Variable Names
 - Advanced Control Structures (IF-THEN, WHILE, CASE, etc.)
- **Program Development:**
 - Interactive Environment
 - Advanced Editor with Search/Replace/Cut and Paste
 - Interactive File Merging
 - Simplified, Single Key Commands
- **System:**
 - Ability to link other MBASIC, FORTRAN or Assembly Modules
 - Full File Control (Copy, Delete, etc.)
 - Complete Serial Port Control (Baud Rate, Parity, etc.)

FLEXSYS™ TEST SOFTWARE

ATLAS



FlexSys ATE Workstation Software (For 1722A)

- Allows reconfiguration without recompiling or modifying test programs
- Provides the advantages of ATLAS language at a fraction of the cost of current solutions
- Touch-sensitive, menu-driven user interface means easy training and use
- Compact workstation fits on bench or in the rack; expandable to 2.6 mbytes RAM
- Includes programming tools such as syntax checking, utilities for efficient debugging, and easily customized screen menus
- Integrates a wide range of ATE equipment via IEEE-488
- High-speed compile — typical 500 ATLAS statements per minute

FlexSys is a complete ATLAS software package that runs on Fluke's powerful IEEE-488 controller, the 1722A. For both large and small systems application, it provides the benefits of the ATLAS language at a fraction of the cost of other systems. FlexSys was developed by Fluke in conjunction with Lexico, a leader in ATLAS language systems.

With FlexSys, reconfiguration is rapid and easy without recompiling or modifying test procedures or Test Program Sets through the use of Resource Descriptions (RD). The result is lower cost for software development.

The Resource Description, the heart of FlexSys is a data base of instrument characteristics utilized by the system at run time. RD's define

the codes and formats for a given instrument as well as the accuracies, ranges, timeouts and delays. The use of RD's at run time facilitates the rapid and straightforward configuration of the ATE station as well as independent of test program development from specific ATE hardware design.

FlexSys provides for:

- ATLAS Test Program Sets (TPS) development
- Resource Description generation
- Test station instrument configuration
- Compiled program execution in a real-time or simulated mode of operation

Test Program Set Development

A touch-screen, menu-driven interface lets the user develop Test Program Sets and retain a history of inputs easily and efficiently.

A parsing editor provides both manual and automatic syntax checking during development of ATLAS Test Program Sets.

The ATLAS Compiler prepares ATLAS test procedures for execution through four phases.

1. Verification of ATLAS syntax, semantics.
2. Generation of executable binary files.
3. Covering or comparing signal statement requirements to corresponding require statements to verify that the defined virtual resources can meet test program requirements.
4. Cross-reference table listing the connections between instrument ports and Unit Under Test (UUT) pins.

The Non-ATLAS procedure capability is used for the following:

1. Access to 20 predefined IEEE-488 bus drivers. The bus drivers allow direct control of 13 lines of the bus — the eight data lines and five control lines. The most common use of these drivers would be to manipulate a UUT which is controlled through the 488 interface. The drivers may also be used to control ATE functions not currently supported by IEEE ATLAS.
2. Perform user defined procedures displaying custom screen menus through a library of Touch Screen drivers. Utilization of Touch Screen menus allows full operator interaction with a running ATLAS TPS without the need for a keyboard.
3. Perform user defined procedures that utilize the pixel graphics capability of the 1722A.

The user can create Non-ATLAS Procedures in FORTRAN, C, or Assembly languages. (Support for procedures written in C available May 1986.)

Resource Description Development

With FlexSys actual resources used at run time need not be predefined — a feature unique among ATE Systems. Instead, Real Resources (Station Test Equipment) which meet the conditions of ATLAS REQUIRE statements are specified after compilation of the ATLAS test procedures. Information contained in the Resource Description Data Base specifies the following:

- Available functions and capabilities.
- Native IEEE-488 bus codes that control the instrument.
- The data format of information returned to the controller.
- Miscellaneous information such as settling times, instrument error codes, etc.

This data is used at run time, allowing compilation to be accomplished independent of real resources. RDs for system resources may be written by the resource manufacturer or by the user.

System Configuration

Independent System Configuration gives the user the ability to configure and reconfigure his system with minimal cost and effort by allowing the test program sets to be run without modification. Configuration integrates the instruments on the 488 bus into a functional ATE test station.

The configuration process identifies the instruments connected to the bus and creates a Resource Description Table. This table is a collection of resource descriptions, for each instrument in the test station taken from

the RD library. ATE configuration is independent of the ATLAS Test Program Set so that the ATE configuration need not be re-established as long as the instruments on the bus do not change.

Resource assignment establishes the logical mapping of the real resources on the bus to the virtual resources specified by the ATLAS Test Program Set to perform the following:

- Assign a real instrument resource for each virtual resource in the Test Program Set.
- Check that the real resources on the bus do, in fact, satisfy the virtual resource specifications in the ATLAS REQUIRE statements.
- Choose signal paths which are defined in the system interface RD for use at run time.

Test Execution

Test Execution provides for:

- TPS Selection
- Simulation
- Execution
- Debug Monitoring

TPS Selection

TPS Selection allows the test operator to select from available test programs. This is conveniently done using the touch-sensitive screen to page through possible selections and designate which test program to execute.

Simulation

The Simulation Option is provided to allow a test programmer to verify correct operation of test procedures and Resource Descriptions without actual use of the ATE system.

Test Execution

The test equipment is controlled using the programming codes extracted from a resource description to meet functionality specified in the ATLAS Signal Statement.

Debug Monitor

The debug monitor commands include single step execution, setting break points, enable program trace and examination of program variables. The test engineer may examine and alter system flags and the command buffers sent to the instruments. The debug monitor allows debugging to take place at the ATLAS statement level.

Documentation

Documentation is presented for both the novice and advanced users. Product documentation includes:

- Getting Started Manual
- System Guide
- System Configuration Manual
- ATLAS Program Development Manual
- Resource Description Development Manual
- Test Execution Manual

The FlexSys manual set is organized in reference form, with tab dividers, indexes, section headers on each page, and a consistent readable format. The manuals are supplemented with tutorial introductions and numerous examples.

The ATLAS ATE Workstation is available in three configurations:

Model 1790A-500

ATE system Development Software: Provides all capabilities required for resource description development, station configuration, TPS development and test execution, complete with sample RDs.

Model 1790A-400

TPS Development Software: Provides the capabilities required for TPS development configuration and execution (for the user who does not develop his own RDs).

Model 1790A-300

Test Execution Software: Provides all capabilities required for execution of ATLAS TPS.

Options

1790A-401 and 1790A-501 Simulation (available only for 1790A-400 and -500)

This option allows a test programmer to verify correct operations of test procedures without the actual use of an ATE System.

1790A-402 and 1790A-502 External Non-ATLAS Procedure Linkage (available only as an option for 1790A-400 and -500)

This option allows access to the 20 predefined IEEE-488 bus drivers and user defined procedures written in FORTRAN, C*, or Assembly languages. FORTRAN, package needs to be purchased as separate item 17XXA-202. "C" capability via External Non-ATLAS Module — the "C" compiler from Van Data and the Assembler package from Fluke (17XXA-201) has to be purchased separately.

1790A-301 Configuration (available only as an option for 1790A-300) (Included in -500 and -400)

This option allows for the rapid reconfiguration of hardware within the test station without recompilation of ATLAS Test procedures.

*"C" linker will be available after April 1986.

Model

January 1986 prices

1790A-500 Development System Software	\$12,000
1790A-501 Simulation	750
1790A-502 Non-ATLAS Module Linkage	250
1790A-504 Phone-in Consulting Service for Development	
System Software, per month	100
1790A-400 Integration System Software	9950
1790A-401 Simulation	750
1790A-402 Non-ATLAS Module Linkage	250
1790A-404 Phone-in Consulting Service for Integration	
System Software, per month	100
1790A-300 Test Execution Software	3500
1790A-301 Configuration	250
1790A-304 Phone-in Consulting Service for Test	
Execution Software, per month	100