DATA ACQUISITION SYSTEM

1752A

NEW

1752A With Keyboard

1752A Data Acquisition System

- Analog Measurements to 1,000 per second, accuracy of 0.02%
- Touch Sense Graphics Display
- High Performance Processor with Macrostore™ floating point processing
- 136K bytes RAM Expandable to 2.6M bytes
- 400K byte Floppy Disk
- BASIC Programmable with real-time and measurement and control extensions
- IEEE-488, RS-232/422, Current Loop and Parallel Interfaces
- Rack Mountable with removable keyboard
- Analog Control Option (Voltage or Current)
- Status Input/Output Option
- Counter/Totalizer Option

The Fluke 1752A Data Acquisition System is a powerful microcomputer-based system for measurement and control applications. The data acquisition functions are integrated into the same chassis as the computer to minimize desktop or rack space, simplify programming, and increase system performance. The 1752A's BASIC offerings provide a structured programming environment tailored for high speed data acquisition and instrument control. Single-word commands simplify the task of writing programs for both data acquisition and IEEE-488 compatible instrument control.

Its touch screen replaces a keyboard or switch panel, allowing the operator to respond to prompts one at a time. System control may then be accomplished by simply touching the screen.

High Performance Microcomputer

The 1752A is a microcomputer designed for control of automated instrument systems in the laboratory, the plant, or the factory and for information management systems.

The 1752A's 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 started up, the 1752A 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 1752A 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 1752A 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 1752A includes four slots for additional memory and interface options. The standard 136K RAM memory is internally expandable to over 2.6 megabytes. The 400K-byte internal floppy disk drive capacity can be expanded through the 1760A or 1761A Disk Drives to 2 megabytes of on-line floppy disk file storage. An external Winchester Disk Drive System brings 10 megabytes of file capacity on-line. And bubble memory options

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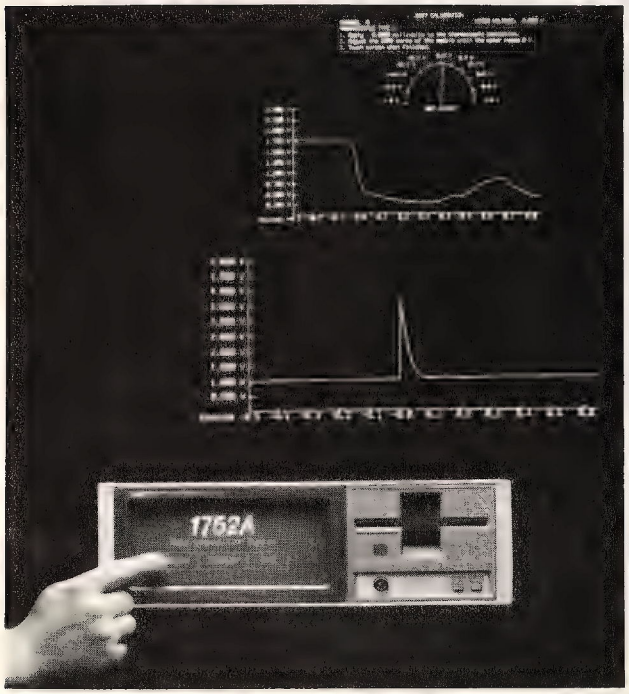
can be installed for up to 1.0 megabytes of rugged, non-volatile file storage especially well suited for harsh environments.



Touch-Sensitive Display System

Touch-Sensitive Display System

With its touch-sensitive display, the 1752A 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 1979. It has proven to be a rugged, reliable component.

Characters Plus Graphics

The graphics display capability of the 1752A is independent of its character display, and of the 1752A central processor. With its own display processor, high speed vector generation hardware, and 64K graphics display memory, the 1752A 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 1752A 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.

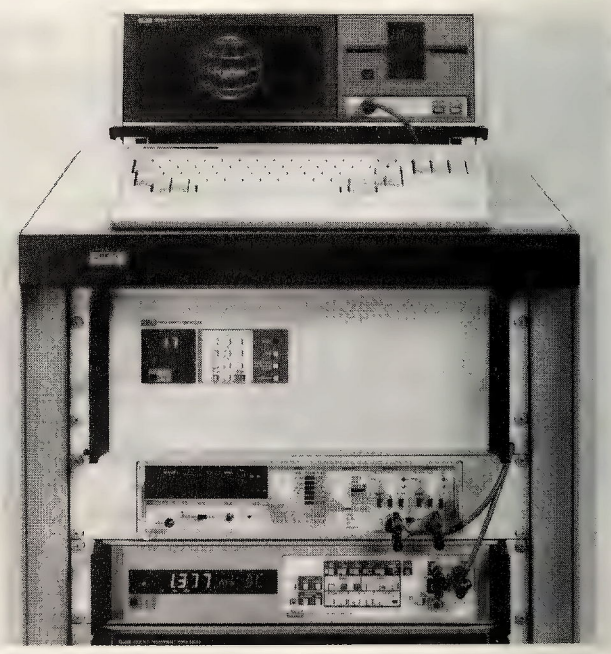
The 1752A includes an industry standard composite video output that will display whatever is on the 1752A screen on a video monitor. This can be useful for training presentations as well as for system requirements that include a remotely mounted display.

Data Acquisition and Control

The 1752A-010 Analog Measurement Processor allows the 1752A to connect to 16 differential or 32 single-ended inputs, and acquire data at up to 1,000 readings per second. Multiple 1752A-010's may be installed to increase system throughput to 4,000 readings per second. (Any single input, however, can be sampled at a maximum rate of 1,000 per second.) Normal mode rejection may be added through either internal line synchronization, or external synchronization, using the Y1752A Line Synchronization Transformer. The Analog Measurement Processor interfaces to the 1752A bus without isolation. Inputs are protected against damage to 50V dc, and fused input resistors decrease the risk of dangerous higher voltages reaching system operators. An external signal conditioning subsystem is available which provides isolation as well as signal conditioning for inputs such as ac voltages, thermocouples, RTDs and strain.

For analog control, use the 1752A-011. This option allows the 1752A to control devices which accept a 0 to 20 mA or a ±10V dc control signal. Each of the four outputs can be individually configured for either current or voltage.

For frequency, time, and totalizing measurements, the 1752A-012 option offers a single input. To sense switch closures or logic levels, as well as perform on-off control, use the 17XXA-002 Parallel Interface. This option offers 32 bits configurable for either input or output. To switch higher levels, an optional digital isolation subsystem is available. To expand your system, use the 1702A Extender Chassis. This increases the number of slots available for measurement and control options by 11. More 1702's may be added for larger systems.



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Interfacing

The 1752A includes an IEEE-488 bus interface and an RS-232-C serial data 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 1752A programming language. The 1752A can be set up to function as a system controller or as an addressable device in a multiple-controller system. In either configuration, the 1752A can pass control to another controller and take it back when offered. As system controller, the 1752A 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 IEEE-488 interface and an additional RS-232-C serial data port. The 1752A can accomodate up to two IEEE-488 ports.

Option 17XXA-009 is a reconfigurable, dual serial-data 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 2.0M 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 1752A will run entirely out of the electronic disk.

Bubble Memory Options (-004, -005)

The -004 and -005 options are bubble memory boards that provide either 256K (-004) of 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 1752A 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 1752A 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 1752A. It interfaces to the 1752A via the IEEE-488 port. Transfer rate is 22K bytes per second.

Software

The 1725A offers an environment specifically suited to the development of real-time control programs. For more information on 1752A software systems, consult the 1700 Series Software section, following this section. A data acquisition library provides routines directly accessible from BASIC, greatly simplifying data acquisition and control tasks. The "Getting Started" software provides the user with a number of useful programs, allowing the user to access many of the 1752A's capabilities through the touch screen.

Module-Level Diagnostics

The 1752A 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 1752A 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 usually 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 1752A 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 1752A through its manuals. You will be pleasantly surprised.

Specifications

Analog Measurement Processor (-010)

Number of Channels: 16 differential or 32 single-ended (single and differential channels may be mixed)
System Capacity: 4 processors, 128 single-ended channels
Ranges: (full scale, each channel) ±1.0158V; ±10.158V; ±65 mA; 4 to 20 mA displayed as 0 to 100% of scale
Reading Rate: Synchronized Modes-400 channels/s @50 Hz, 480 channels/s @60 Hz, 400 channels/s @400 Hz; Asynchronous Mode-1000 channels/s
Accuracy (90 days): (10 to 40°C operating) 10V Range ±(0.02% of reading + 1.24 mV); 1V Range ±(0.02% of reading + 248 μV); 65 mA Range ±(0.05% of reading + 16.5 μA)
Common Mode Rejection: dc -77 dB; 50/60 Hz, 60 dB
Normal Mode Rejection: Asynchronous mode, 0 dB; internally synchronized, 20 dB; Externally synchronized, 45 dB
Input Protection: To 50V rms without side effects, fuse protected to 240V rms
Connector: Requires two Y1750s

Analog Control Output Option (-011)

Outputs: Isolated. Four per module. Voltage (-10V to +10V) or current (0 to 20 mA), individually selectable
Resolution: 2 mV (13 bits) or 5 μA (12 bits)
Isolation: ≤30V dc or peak ac, channel to channel
Max Load: ±5 mA in voltage mode; ≤750Ω in current mode

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90-Day Accuracy: ±20 mV in voltage mode and ±20 μA in current mode for ambient temperature of 18°C to 28°C
Rate: 1000 changes/sec
Connector Option: Use 2400A-110 or 2400A-111

Counter/Totalizer Signal Input Option (-012)
May be used to perform the following measurements: Frequency, period, totalize, tachometer, "A" gated by "B", and time interval.
Inputs: TTL, Gate 1, Gate 2, Trigger, Count Up, Count Down, Up/Down, Count, Non-Isolated Common, Isolated Common, Isolated Analog Input
Isolation: Both Analog Input and Isolated Common are isolated from the 1752A and/or ground up to 30V and up to 1.0 V/μs maximum slew rate
Frequency Range: 0 to 900 kHz (TTL Input); 10 Hz to 200 kHz (Analog Input)
Period Range
TTL Input: 1.1 μs to 6.7s
Analog Input: 5 μs to 0.1s
Period Resolution: 400 ns
Time Interval Range
TTL Input: 1 μs to 3.82 hr
Analog Input: 2 μs to 50 ms
Time Interval Resolution: 819 μs (≤3.82 hours); 400 ns (≤6.7 seconds)
Totalizer Input Range: Dc to 900 kHz
Minimum Pulse Width: 400 ns
Totalizer Capacity: -8,388,608 to +8,388,607
Connector: 12 conductors, supplied with option (screw terminals)

Parallel Interface (-002)
Data I/O lines terminated with 2400Ω to +5V, 5000Ω to ground, with diode input protection. Schematics provided with documentation. Update rate: 3000/s (status output).

General 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, Data Acquisition and Control Guide, and a pad of 50 display worksheets

Model

January 1986 prices

1752A Data Acquisition System (with one 1752A-010 Analog Measurement Processor) $7400
1752A-1 Data Acquisition System (without 1752A-010 Analog Measurement Processor) 6500
1702A Extender Chassis (Requires 1752A-013) 2260

Options

17XXA-002 Parallel Interface 790
17XXA-004 256K byte Bubble Memory 3250
17XXA-005 512K byte Bubble Memory 5450
17XXA-006 256K byte RAM Expansion 1000
17XXA-007 512K byte RAM Expansion 1400
17XXA-008 IEEE-488/RS-232-C Interface 590
17XXA-009 Dual Serial Interface 850
1752A-010 Analog Measurement Processor 990
1752A-011 4 Channel Analog Output 990
1752A-012 Counter/Totalizer 630
1752A-013 Extender Interface 310

Software Options (Also see page 200)

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 Development System 490

Peripherals

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

Accessories (Also see page 230)

Y1700 Programmer Keyboard 395
Y1703 RS-232-C Null Modem Cable, 4m 150
Y1705 RS-232-C Null Modem Cable, 0.3m 75
Y1706 Certified Blank Disks Unformatted (pkg of 10) 100
Y1707 RS-232-C Interface Cable, 2m 125
Y1708 RS-232-C Interface Cable, 10m 150
Y1709 Printer Cable, 2m 125
Y1711 Reinforced Shipping Case, w/handles 300
Y1717 Parallel Interface Cable 150
Y1750 Input Terminal Block with Cable 65
Y1751 Replacement Cable Set for Y1750 65
Y1752 Line Frequency Sync Transformer 50
Y1790 Rack Mount Kit with 24" Slides 175
Y1791 Rack Mount Kit for 1780A (requires slides) 95
Y1795 Portable Carry Handle 48
M00-260-610 18" Rack Slides 105
M00-280-610 24" Rack Slides 110
Y8021 Shielded IEEE-488 Interface Cable, 1m 85
Y8022 Shielded IEEE-488 Interface Cable, 2m 95
Y8023 Shielded IEEE-488 Interface Cable, 4m 105
2400A-110 Screw Terminal I/O Connector 135
2400A-111 Solder Pin I/O Connector 45

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.