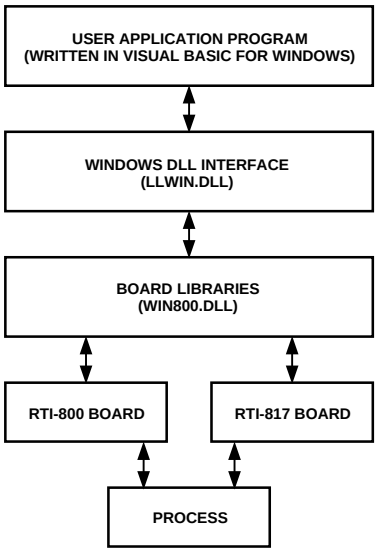
Software Drivers—Windows® and DOS®

SW800 Series

FEATURES

Supports Popular Languages
- **Windows 3.1**
  - **Microsoft® Visual BASIC for Window**
  - **Microsoft Visual C++ for Windows**
  - **Borland Turbo C++ for Windows**
  - **Borland Turbo Pascal for Windows**
- **MS-DOS®**
  - **Microsoft Interpreted GWBASIC**
  - **IBM Interpreted BASIC**
  - **Microsoft QuickBASIC**
  - **Microsoft C/C++**
  - **Borland Turbo C++**
  - **Borland C++**
  - **Borland Turbo Pascal**
- **Callable Subroutine Libraries**
  - **Analog and Digital I/O**
  - **Frequency and Event Counting**
  - **Pulse Output**
  - **Interrupt Servicing**

INTERFACING AN APPLICATION PROGRAM



GENERAL DESCRIPTION

The SW800 Series of Windows and DOS Drivers are software packages that provide subroutine calls to access the I/O functions of the RTI-800 Series of Analog and Digital boards. There are four hardware-specific packages. Each package includes support for high level languages in both Windows and DOS. (See list of supported languages in the features chart.)

The driver software packages provide a high level interface to the RTI-800 Series analog and digital boards. Complex analog, digital, and counter/timer I/O operations are simplified with keywords such as SCAN, AOT, FINSTART. In order to use the driver software, experience with a programming language such as BASIC or VISUAL BASIC for Windows and familiarity with the application is required.

Each SW800 Series driver software package consists of all language libraries and a board library for the specific hardware supported. The language libraries include a language binding that handles the different parameter passing conventions used by the languages, as well as calls to the hardware libraries. Board libraries contain the low level subroutines that perform the I/O routines. Common language-specific packages within the SW800 Series can be merged to run in one system. For example, if a user wants to operate an RTI-815 and RTI-827 board in the same system and wants to develop an application in Microsoft C++, the SW800 and SW827 packages can be combined using the LINK facility.

An error-processing system checks for argument errors in every setup and I/O subroutine. Attempts to operate in illegal modes are trapped, and error codes are reported. Run-time errors such as “Overrun error detected” are also reported.

Table I lists the I/O routines in the SW800 Series of MS-DOS and Windows Driver Software packages. The target system for the SW800 Series of Driver Software is an IBM PC/AT or 100% compatible system with PC-DOS, MS-DOS (Version 3.3 or higher), or Windows 3.1, and one floppy disk drive and one hard disk drive.

Table II lists application software packages, available from third party vendors, which require little or no programming on the part of the user prior to configuring and running an application. Applications range from simple data collection and analysis to real-time control and high speed streaming of data to disk.

REV. 0

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Fax: 617/326-8703

UTILITIES DISK
A 3.5" utilities disk (SW-UTIL-D3) is shipped with each RTI-800 Series board. This disk contains the programs listed below.

EXER—Self-documenting, menu-driven program that allows access to all the RTI-800 Series board's functionality through software. EXER can be used as a diagnostic tool or as a means of becoming familiar with the capabilities of the board prior to developing an application program.

DMACONF, MLTDLOAD—Used to configure and allocate DMA buffers. If RTI-800 Series boards have unique DMA channels, then multiple boards can perform DMA-based operations at the same time.

CONF—Creates a table containing RTI-800 Series hardware configuration information that is used by the SW800 Series Driver Software and some application-specific software packages.

CAL800, CAL835, CAL860—Calibrates the analog I/O circuitry of RTI-800 Series boards.

The following sample is a fragment of a Microsoft C program using the SW860 Driver package that simultaneously samples two channel groups on the RTI-860 board and stores the data in on-board memory.

Channel Group 3 is read first (Group 3 consists of Channels 12, 13, 14 and 15); Channel Group 0 (consisting of Channels 0, 1, 2 and 3) is read next. This sequence repeats until the sample count is satisfied. CHECK verifies that the operation is complete. When the data is required. RRUF transfers it from on-board memory to the user-defined array in system memory.

```
{
INITIALIZE (&erstat);
if (erstat) printf ("\n\tINITIALIZE error: %2d\n'',erstat);
else
   {
   lchan=5;
   board=7;
   chanarr[0]=2: /*two groups in channel sequence*/
   chanarr[1]=3; /*group 3 is first group in sequence*/
   chanarr[2]=0: /*group 0 is second group in sequence*/
   range=1000;
   mult =10; /*pacing interval = range times mult microseconds*/
   count=400;
   simul=1; /*enables simultaneous sampling*/
   brdbuf=1000; /*starting location in on-board memory*/
   BSCAN860 (lchan,board,chanarr,range,mult,count,simul,&erstat);
   if (erstat) printf ("\n\tBSCAN setup error: %2d\n",erstat);
   else
      {
      BSCAN(lchan,brdbuf,&erstat);
      CHECK(lchan,&erstat);
      while (!erstat) CHECK (lchan,&erstat};
      if (erstat!=117) printf ("mn\tRBUF error: %2d\n",erstat);
      else
         {
         RBUF (lchan,dest,&erstat);
         if (erstat) printf ("\n\tRBUF error: %2d\n",erstat);
         else
            {
            printf ("\n\n\tBSCAN values: \n\n");
            for (lp=0; lp<< count; lp++) printf ("%8d",dest[lp];
            }
         }
      }
   }
}
```

Sample Program Using SW860

Table I. RTI Series Driver Software Routines

Operation/ Routine	800	802	815	817	820	827	834	835	850	860	Description
ANALOG INPUT											
(X)AIN	•		•		•		•	•	•	•	Acquires data from a single analog input channel.
(X)AING	•		•		•		•	•			Acquires data (polled) from a group of analog input channels.
(X)COLLECT	•		•						•	•	Use DMA (paced) to acquire data from a single input channel.
(X)CCOL									•	•	Collects data (paced) from a single analog channel and continuously transfers the data to system memory.
BCOL									•	•	Acquires data (paced) from an input and stores it in on-board memory.
(X)SCAN	•		•						•	•	Uses DMA to acquire data from a group of inputs (paced).
(X)CSCAN							•	•	•	•	Acquires data (paced) from a user-specified sequence of channels and and continuously transfers the data to system memory using interrupts.
BSCAN									•	•	Acquires data (paced) from a user-specified sequence of channels into on-board memory.
(X)AVG									•	•	Uses DMA to acquire data from an analog input channel and averages the data.
(X)CAVG									•	•	Acquires data from an analog input channel, continuously transferring the data to system memory (paced) and returns the average value.
RBUF									•	•	Transfers data from on-board memory into system memory.
ANALOG OUTPUT											
(X)AOT	•	•		•			•				Writes a value to a single analog output channel.
X)AOTG							•				Writes multiple values to a single analog output channel or a group of analog output channels.
DIGITAL INPUT											
DINB	•		•	•	•	•	•	•			Reads one bit from a digital I/O port.
DIN	•		•	•	•	•	•	•			Reads eight bits from a digital I/O port.
DIGITAL OUTPUT											
DOTB	•		•	•	•	•	•	•			Writes one bit from a digital I/O port.
DOT	•		•	•	•	•	•	•			Writes eight bits from a digital I/O port.
DOTR	•		•	•	•						Reads back last value written to output port.
FREQUENCY INPUT											
FINSTART	•		•			•	•	•			Starts a frequency input operation.
(X)FINREAD	•		•			•	•	•			Returns the frequency measured.
FINSTOP	•		•			•	•	•			Stops a frequency input operation.
EVENT COUNTING											
EVINIT	•		•			•	•	•			Initializes counter/timer for event counting.
EVSTART	•		•			•	•	•			Starts the event counting operation.
EVSTOP	•		•			•	•	•			Stops the event counting operation.
EVREAD	•		•			•	•	•			Reads the number of events counted.
PULSE OUTPUT											
PULSE	•		•			•					Outputs a pulse.
PULSTART	•		•			•	•	•			Starts a pulse train with a user-specified period and duty cycle.
PULSTOP	•		•			•	•	•			Stops the pulse output train operation.
CONVERSION AND LINEARIZATION											
CONV	•	•	•		•	•	•	•	•	•	Converts counts to engineering units or engineering units to counts.
SETSCALE	•		•		•	•	•	•	•	•	Defines linear relationships used for scaling analog inputs.
MISCELLANEOUS											
DEB						•					Sets debounce time.
TRIG	•		•			•	•	•	•	•	Defines triggering parameters.
GATE						•	•	•			Defines gate parameters.
ACTIO						•	•	•			Activates a specified function upon receipt of an interrupt.
CLRIO						•	•	•			Disables an interrupt enabled by ACTIO.
SETOUT	•	•	•	•	•	•	•	•			Defines a user-specified value that is written to a counter/timer, digital or analog output channel upon program termination.
CLCHAN	•	•	•	•	•	•	•	•	•	•	Clears the specified logical channel.
DELAY*	•	•	•	•	•	•	•	•	•	•	Postpones execution of the code for up to one hour.
INITIALIZE	•	•	•	•	•	•	•	•	•	•	System routine that resets all RTI-800 series boards in system.

An (X) indicates that the value can be expressed as an integer (raw counts from A/D or D/A) or as a real number in engineering units, i.e., volts, amps, psi, Hz.
*Not available in windows.

SW800 Series

ORDERING INFORMATION

Each SW800 Series driver software package is shipped with all language libraries (Windows and MS-DOS) on 3.5", 720K double sided, double density diskettes; a software manual; and Analog Devices End-User Software License. OEM and redistribution licenses are available; please consult factory.

SW800
Supports the RTI-800/RTI-802/RTI-815/RTl-817/RTI-820

SW827
Supports the RTI-827

SW835
Supports the RTI-834/RTI-835

SW860
Supports the RTI-850/RTI-860

MANUALS

A software manual is supplied with each Driver Software package. Additional Manuals are available.

AC1938
RTI-827 Software Manual

AC1940
RTI-834/RTI-835 Software Manual

AC1941
RTI-800, RTI-802, RTI-815, RTI-817, RTI-820 Software Manual

AC1942
RTI-850, RTI-860 Software Manual

Table II. Guide to Third Party Software

Vendor	Package	Operating Environment	Analog Devices Hardware										
			6B Series	800	802	815	817	820	827	834	835	850	860
DSP Development Corp. One Kendall Square Cambridge, MA 02139 617-577-1133	DADiSP	Windows & DOS	•	•	•	•	•	•	•			•	•
HEM Data Corporation 17336 12 Mile Road Southfield, MI 48076 810-559-5607	Snap-Master Snap-Series	Windows DOS		• •		• •				•	•	 •	 •
Iconics Inc. 100 Foxborough Blvd. Foxborough, MA 02035 508-543-8600	Genesis	DOS	•	•	•	•	•	•					
Intellution 315 Norwood Park South Norwood, MA 02062 617-769-8878	The Fix	DOS		•	•	•	•	•					
Keithley Metrabyte 28775 Aurora Road Cleveland, OH 44139 216-248-1344	Asyst Viewdac Easyest	DOS DOS DOS		• • •	• • •	• • •	• • •	• • •					
LABTECH 400 Research Drive Wilmington, MA 01887 508-657-5400	Notebook Notebook/XE Notebook/LE LT/Control Acquire	Windows & DOS Windows & DOS Windows & DOS Windows & DOS DOS	• • • •	• • • • •	• • • •	• • • • •	• • • •	• • • •	• • • •	• • • 	• • • 	• • • •	• • • •
NemaSoft Inc. 55 West Street Walpole, MA 02081 508-660-1221	Paragon 500/550	DOS	•	•	•	•	•	•					
Quinn-Curtis 35 Highland Circle Needham, MA 02194 617-449-6155	Control EG	DOS	•	•	•	•	•	•					
TA Engineering Co., Inc. 1150 Moraga Way Moraga, CA 94556 510-376-8500	AIMAX-PLUS AIMX-WIN	DOS Windows	• •										

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