CAS24 Code Activated Switch
(PRELIMINARY INFORMATION, MARCH 3, 2001)

The CAS24, Code activated switch, can be used to implement an RS485 (2-wire, half-duplex) or an RS422 (4-wire, full-duplex) network, using non-addressable RS232 target/remote devices. By selecting a user programmable "attention character," in conjunction with a user programmable "unit hex address" (external or internal EEPROM) for each CAS24 Code Activated Switch, as many as 255 RS232 devices can be granted access to the network. The following illustration demonstrates how up to "N" RS232 devices can be connected to a multi-drop network (repeaters may be necessary), using the attention character "*" for each device, and an 8-bit unit address (2-digit ASCII HEX) for each CAS24 unit. If desired, more network devices can be added, by defining additional "attention characters". Theoretically 255 new devices can be added for each "attention character" used. The CAS24 is a limited slew rate, non-buffered switch.
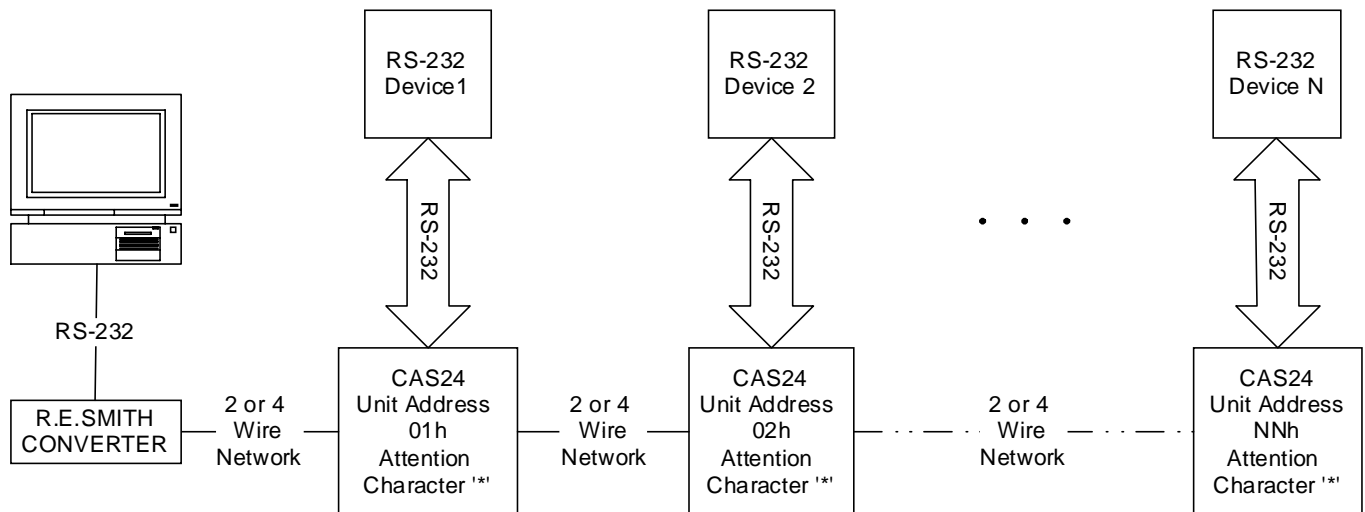
Typical Configuration

Example:

The master controller would send "*01" to the network, the CAS24 unit with address "01" would then allow its RS232 port to transmit and receive characters following the addressing sequence. The CAS24 can be configured to remain "enabled" until the next "attention character" (same) is received. The next unit ("*02") can then be "enabled." Note: an "attention character" should be selected that will NOT interfere with the RS232 device, because the currently selected CAS24 unit will transmit the "attention character" to the RS232 device before it is disabled.

Three user selectable Operating Modes are available using J21 and J22. The factory default "No Time-out" mode is described above. Two "time-out" modes are also available, and can be used in conjunction (or not) with the "attention character" to disable the CAS24 unit. The "Fixed Time-out" mode will disable the unit after a time delay of from 1 to 65535mSec after it is selected. Enough time should be allowed to send a command to the RS232 device and to allow for a response. In the "Keep-alive" mode the timer will be reset ("stretched") each time the host computer sends a new character to an enabled CAS24 unit. By using this user programmable "time window" a system can be implemented that will prevent the next "attention character" from being received by the target RS232 device; however, additional time delay must be introduced for proper operation.

Unit Configuration: The CAS24 unit is user configurable to run in networks at speeds from 2400-115.2k Baud. The default settings for the unit are stored internally in non-volatile EE memory and, external jumpers set the operating modes as follows:

Internally Configured Default Settings:
Baud = 9600, 8 Bit Data, Parity = None, 1 Stop Bit
Internal Address = 0Eh, J26 Installed (external address)
Attention Character = * or 2Ah
Time-out = 100ms, J21 and J22 installed (disabled)
Monitor Mode Baud fixed at 9600 baud, N,8,1

Externally Configured Default Settings:
External Address Enabled = 0Fh, J26 installed, J27-J30 removed, and J31-J34 installed. (J27 = MSB, J34 = LSB)
Baud = 4800 – 19200 baud, J17 installed & J18 removed.
Monitor Mode Disabled, J20,21,22 installed, No Time-out.

Jumper Configuration Tables

Table 1: Switch Operating Mode Settings

Mode	J21	J22	TIME-OUT
* No Time-out	INSTALLED	INSTALLED	DON'T CARE
Fixed Time-out	REMOVED	INSTALLED	100ms Default
Time-out with keep alive function	REMOVED	REMOVED	100ms Default Configurable from 1ms – 65535 ms

Table 2: RS-232 Device Type

RS232 MODE	J1	J2	J3	J4
* COMPUTER	INSTALLED	INSTALLED	REMOVED	REMOVED
MODEM	REMOVED	REMOVED	INSTALLED	INSTALLED

Table 3: Network Operating Speed (* OK to 115.2K also)

BAUD	J17	J18
2400 – 4800	REMOVED	REMOVED
* 4800 – 19200	INSTALLED	REMOVED
19200 – 38400	REMOVED	INSTALLED
38400 – 115.2k	INSTALLED	INSTALLED

Table 4: Network Type

NETWORK	J5	J6	J19	J20	J24	J25
* 2-WIRE	A	B	REMOVED	INSTALLED	A	B
4-WIRE	B	B	INSTALLED	INSTALLED	A	B

Table 5: Address Type (Internal/External)

MODE	J26	J27-J34
* EXTERNAL ADDRESS	INSTALLED	8BIT, J34:LSB
INTERNAL EE ADDRESS	REMOVED	DON'T CARE

Table 6: Monitor Mode Jumper Settings

NETWORK	J1	J2	J3	J4	J5	J6	J19	J20	J24	J25
* 2-WIRE	I	I	R	R	A	B	REMOVED	REMOVED	A	B
4-WIRE	I	I	R	R	B	B	INSTALLED	REMOVED	A	B
RS232	I	I	R	R	X	X	X	REMOVED	B	A

* - Indicates Factory Default Setting

Table 7: Bias, Termination, and Common Jumper Settings (R = remove)

TYPE	J7	J8	J9	J10	J11	J12	J13	J14	J15	J16
TERM.		240	240			240	240			
+BIAS					620				620	
−BIAS				620				620		
COMMON	R=100									R=100

R. E. Smith Configuration Wizard (For Windows 95/98/ME/NT)
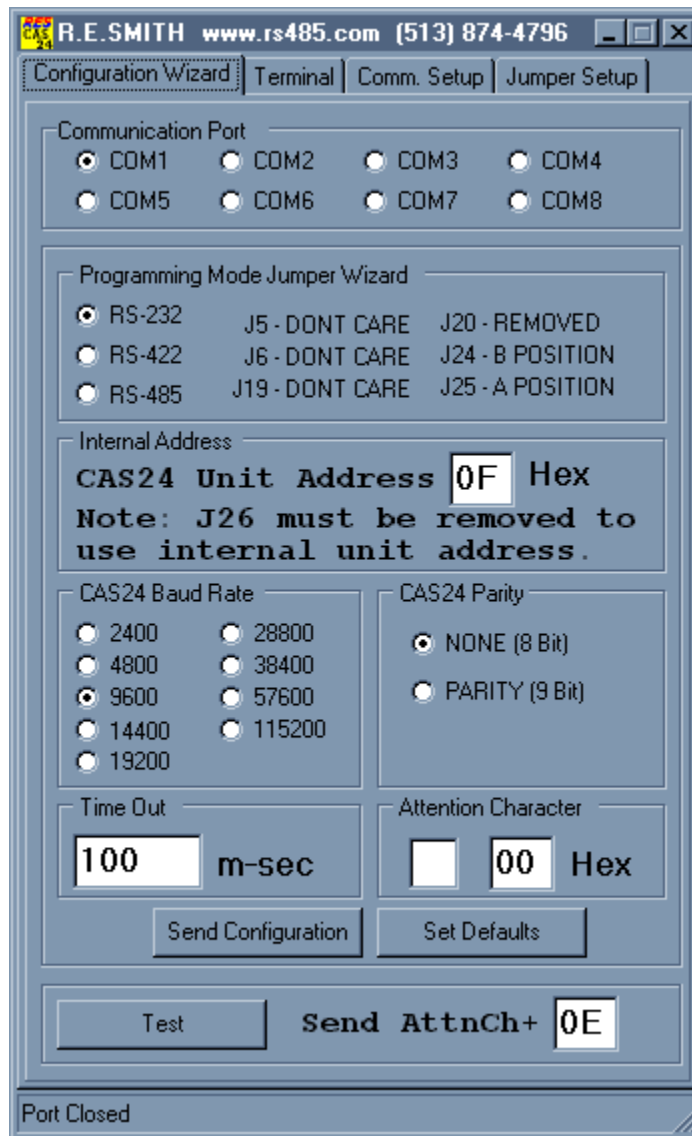
The configuration wizard can be used to aid in the setup of the CAS24 unit. This program communicates with the CAS24 unit when configured in the "Monitor Mode" (J20 Removed). See Table 6 for jumper configuration settings. Note: responses from the target unit are ignored when using the Configuration Wizard. The CAS24 can be "programmed" using RS232, RS485, or RS422. For jumper settings click the communications standard in the section "Programming Mode Jumper Wizard" to see appropriate jumper settings. Set the com port, desired configuration, and then "Send Configuration" to the target CAS24 unit (monitor green RX LED).
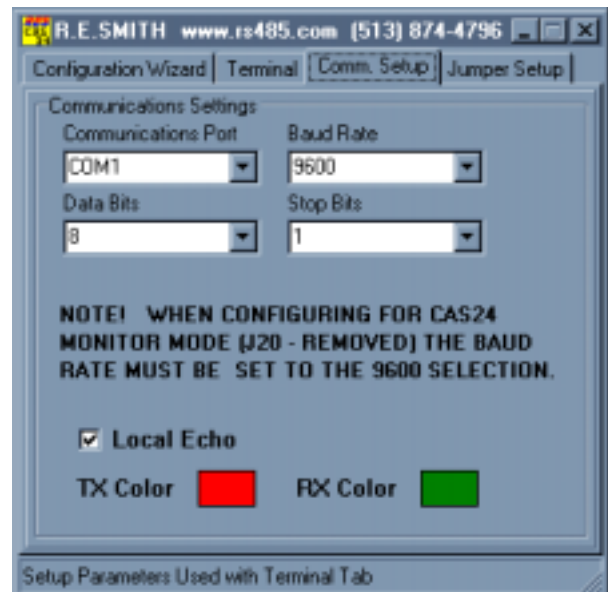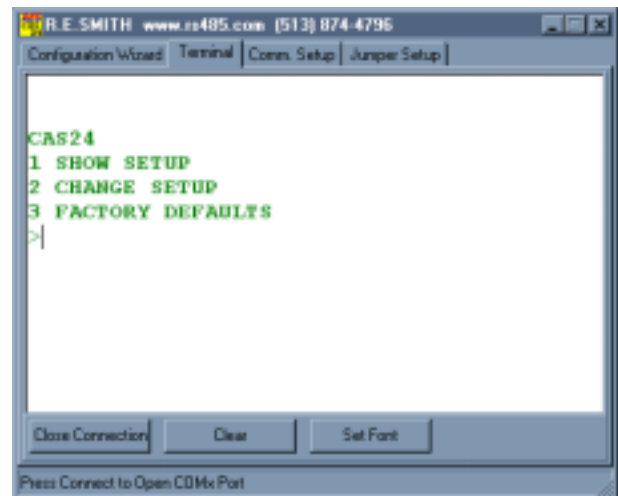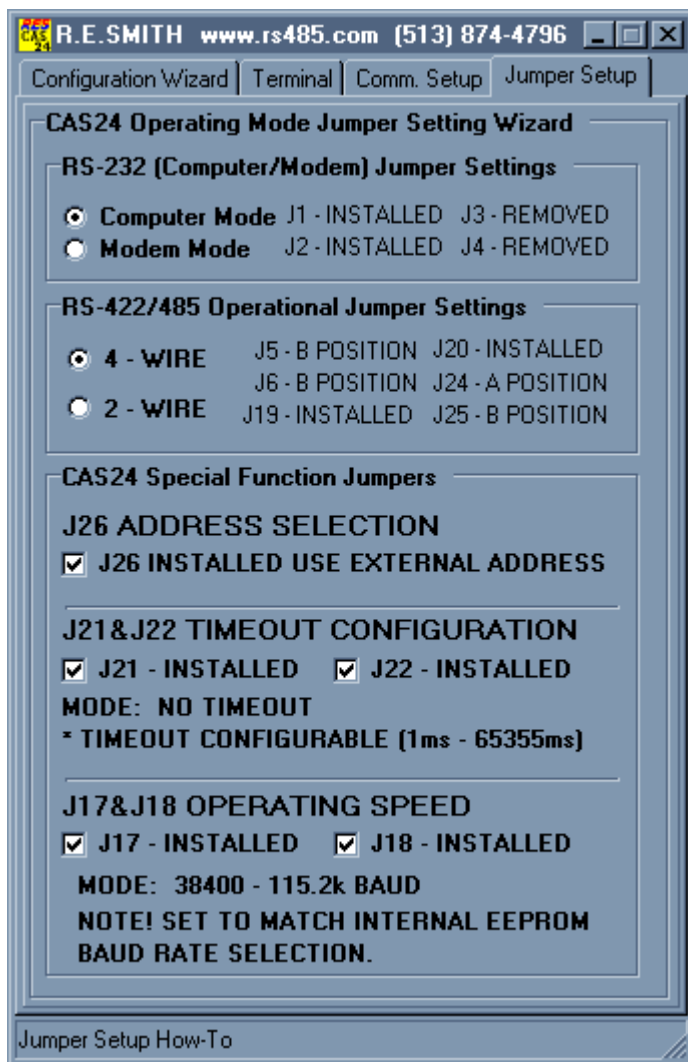
CAS24 MONITOR MODE

When J20 is removed the CAS24 Monitor mode is activated at a fixed baud rate of 9600,N,8,1. See Table 6 for the monitor mode jumper settings. A terminal emulator can be used to display and modify internal settings. Configure the CAS24 for RS232 mode (do not use RS485/RS422), connect at 9600 baud, press the enter key to see the Monitor menu. See "CAS24 Monitor Mode Displays" below. Use Capital letters.

MAIN MENU Display

```
CAS24
1 SHOW SETUP
2 CHANGE SETUP
3 FACTORY DEFAULTS
>
```
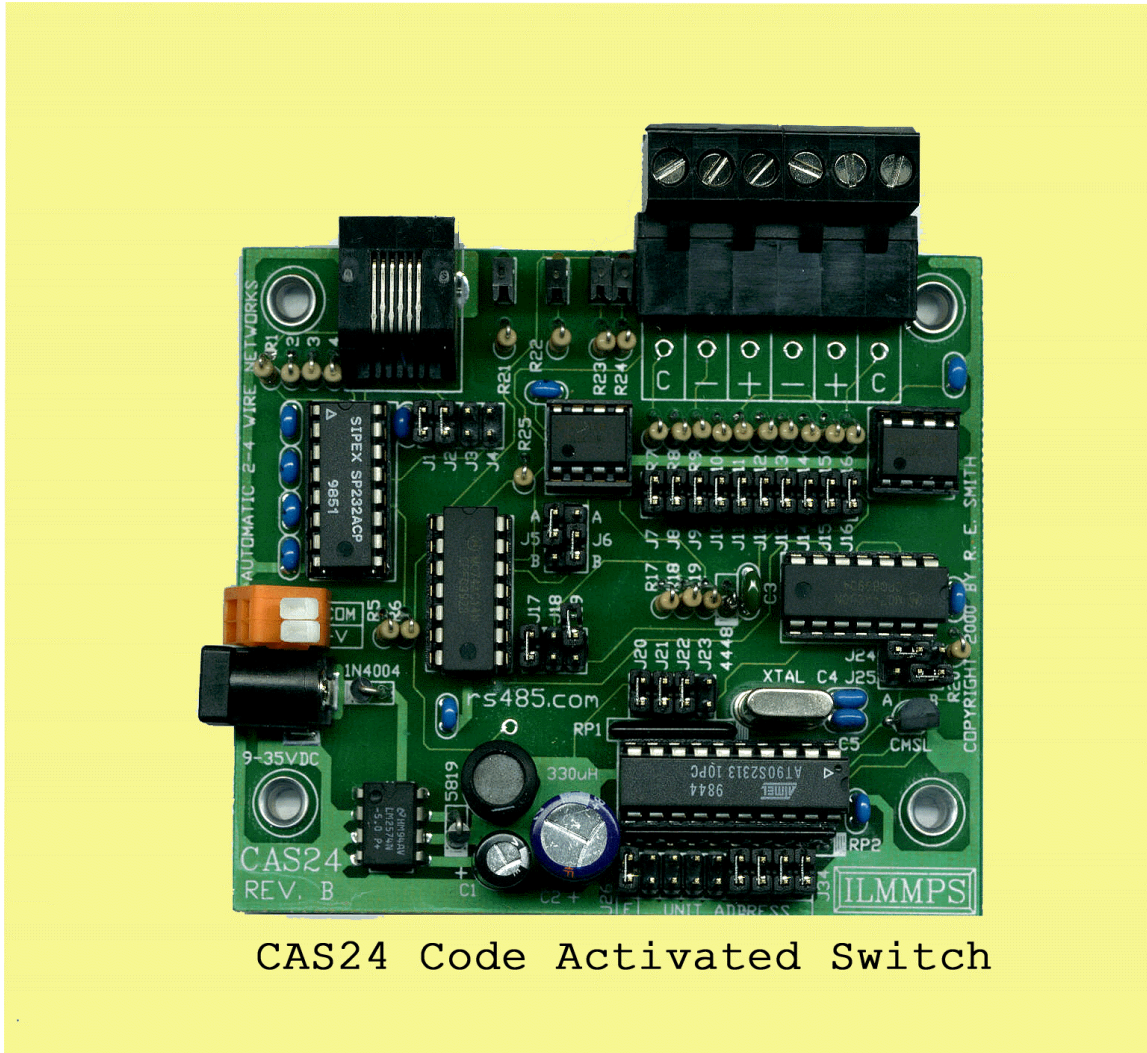
SHOW SETUP Display

```
0-2.4K
1-4.8K
2-9.6K
3-14.4K
4-19.2K
5-28.8K
6-38.4K
7-57.6K
8-115.2K
BAUD:2
PARITY[YN]:N
EEADR:0E
ATTEN[*,2A]
TIMEOUT:0064h
```

CHANGE SETUP Display

```
0-2.4K
1-4.8K
2-9.6K
3-14.4K
4-19.2K
5-28.8K
6-38.4K
7-57.6K
8-115.2K
BAUD:2
PARITY[YN]:Y
TIMEOUT:0200
ATTEN[*]:*
EEADR:0F
```

FACTORY DEFAULTS Display

```
SET DFLT[YN]:Y
```

CAS24 Code Activated Switch

CAS24 Default Factory Setup

Other Information:

The CAS24 uses ½ unit load transceivers (SN75LBC184N) with built in transient protection (400W typical) and limited slew rate drivers (up to 250Kbps). Limited slew rate drivers reduce the reflections normally present in data communications applications. The unit features a very flexible bias and, termination network that is jumper selectable. Termination and bias are generally only installed at the "end" units in an RS485 or RS422 network.

When addressing the CAS24 unit in normal operation, use upper case letters only for the "unit hex address."
Program the unit for Baud rate, parity (optional 9-bit),

internal hex address, attention character and, time-out value. For ease of operation and flexibility it is recommended that J26 be installed to use the external "unit hex address. By using the external address a unit can be replaced with another pre-programmed unit by just setting the address jumpers. Because the CAS24 can also be used as a converter by installing J23, an entire network can be implemented using only the CAS24, a host computer with an RS232 port and, the target RS232 devices.

When used as an RS232 to RS485 converter, moving jumper J6B to J6A will place the unit into a "loop-back/test" mode of operation. Four onboard LED indicators are provided. The yellow LED indicates power is applied. A red (TXD) and green (RXD) pair of LEDs monitor the RS485/RS422 data communications. An additional green LED indicates that the RS232 switch is enabled and ready to send and receive data.

The CAS24 can be manually "enabled" (converter operation) to communicate as a single "jumper selected" device without using an "attention sequence" (Note: disable other units on the network). Jumper J23 when installed will enable the unit to operate as a converter. The onboard processor will be overridden at this time. With J24 in the "A" installed position, the onboard processor is unable to transmit even in the "Monitor Mode." If non-responding devices are used on a network (display signs for example), it is possible to assign a group of devices to the same user address and send a message to one group of units and then select another group of units and send a different message to them. Other units on the network could operate in a normal 2-way mode.

It should be noted that the CAS24 unit does NOT buffer characters that are sent from an RS232 device. If the CAS24 is "turned off" or deselected, then all data communications to that RS232 device is lost. We are working on a "memory-buffered" unit that will have user selectable parameters that will capture asynchronous RS232 data when the unit is disabled. A buffer size of up to 256 characters will be available with a pair of handshaking lines to the RS232 port, and with the ability to set a flag when the buffer reaches a predetermined level. An opto/xformer-isolated version of the CAS24 (ICAS24) will be available in the near future. Call Ron Smith at 513-874-4796 for additional information.