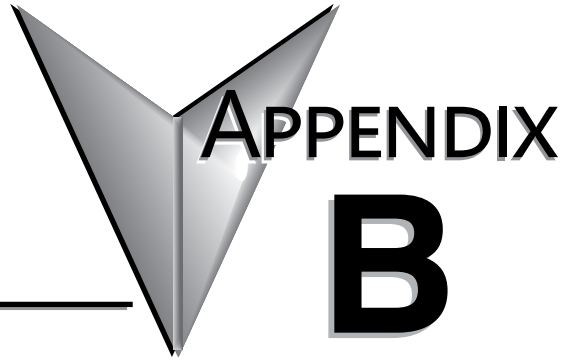
SPECIAL RELAYS



In This Appendix...

D4-454 PLC Special Relays

Special Relays are just contacts that are set by the CPU operating system to indicate a particular system event has occurred. These contacts are available for use in your ladder program. Knowing just the right special relay contact to use for a particular situation can save a lot of programming time. Since the CPU operating system sets and clears special relay contacts, the ladder program only has to use them as inputs in ladder logic.

Startup and Real-Time Relays

SP0	First scan	On for the first scan after a power cycle or program to run transition only. The relay is reset to off on the second scan. It is useful where a function needs to be performed only on program startup.
SP1	Always ON	Provides a contact to ensure an instruction is executed every scan.
SP2	Always OFF	Provides a contact that is always off.
SP3	1 minute clock	On for 30 seconds and off for 30 seconds.
SP4	1 second clock	On for 0.5 second and off for 0.5 second.
SP5	100 ms clock	On for 50 ms. and off for 50 ms.
SP6	50 ms clock	On for 25 ms. and off for 25 ms.
SP7	Alternate scan	On every other scan.

CPU Status Relays

SP11	Forced run mode	On when the mode switch is in the run position and the CPU is running.
SP12	Terminal run mode	On when the mode switch is in the TERM position and the CPU is in the run mode.
SP13	Test run mode	On when the CPU is in the test run mode.
SP15	Test stop mode	On when the CPU is in the test stop mode.
SP16	Terminal PGM mode	On when the mode switch is in the TERM position and the CPU is in program mode.
SP17	Forced stop	On when the mode switch is in the STOP position.
SP21	Break relay 2	On when the BREAK instruction is executed. It is off only when the CPU mode is changed to RUN.
SP22	Interrupt enabled	On when interrupts have been enabled using the ENI instruction.
SP25	CPU battery disabled	On when hardware interrupts are enabled using the ENI instruction.
SP26	I/O update disable	Turned on by the application program, thus freezing the state of the I/O.
SP27	Selectable I/O update disable	Relay can be turned on by the application program. If turned on the I/O update is frozen at last state, for I/O modules sensing a missing terminal block.
SP37	Scan control error	This relay will be on if the actual scan time is in excess of the scan time set in fixed or limit scan modes. The relay contact may be useful in program error recovery.

System Monitoring

SP40	Critical error	On when a critical error such as I/O communication loss has occurred.
SP41	Warning	On when a non critical error such as a low battery has occurred.
SP43	Low battery error	On when the CPU battery voltage is low (only if bit 12 of V7745 is set).
SP44	Program memory error	On when a memory error such as a memory parity error has occurred.
SP45	I/O error	On when an I/O error such as a blown fuse or missing 24V has occurred.
SP46	Communications error	On when a communication error occurs on any of the CPU ports.
SP47	I/O configuration error	On if an I/O configuration error has occurred. The I/O configuration check must be set on in the CPU before this relay will be functional.
SP50	Fault instruction	On when a Fault Instruction is executed.
SP51	Watch Dog timeout	On if the CPU Watch Dog timer times out.
SP52	Grammatical error	On if a grammatical error has occurred either while the CPU is running or if the syntax check is run. V7755 will hold the exact error code.
SP53	Math/Table pointer error	On if there is a math execution error or a table pointer error.
SP54	Communication error	On when RX, WX,RD, WT, instructions are executed with the wrong parameters.
SP56	Table instruction overrun	On if a table instruction with a pointer is executed and the pointer value is outside the table boundary.

Accumulator Status

SP60	Value less than	On when the accumulator value is less than the instruction value.
SP61	Value equal to	On when the accumulator value is equal to the instruction value.
SP62	Greater than	On when the accumulator value is greater than the instruction value.
SP63	Zero	On when the result of the instruction is zero (in the accumulator).
SP64	Half borrow	On when the 16 bit subtraction instruction results in a borrow.
SP65	Borrow	On when the 32 bit subtraction instruction results in a borrow.
SP66	Half carry	On when the 16 bit addition instruction results in a carry.
SP67	Carry	On when the 32 bit addition instruction results in a carry.
SP70	Sign	On anytime the value in the accumulator is negative.
SP71	Pointer reference error	On when the V-memory specified by a pointer (P) is not valid.
SP72	Floating point number	On anytime the value in the accumulator is a valid floating point number.
SP73	Overflow	On if overflow occurs in the accumulator when a signed addition or subtraction results in an incorrect sign bit.
SP74	Underflow	On anytime a floating point math operation results in an underflow error.
SP75	Data error	On if a BCD number is expected and a non–BCD number is encountered.
SP76	Load zero	On when any instruction loads a value of zero into the accumulator.

Communication Monitoring Relay

The Communications Monitoring Relays are numbered in pairs corresponding to CPU port numbers or slot positions in a base. The two relay types are:

Module/port busy – on when the port or the communication module in the referenced slot and base is busy transmitting or receiving. You must use this relay with RX and WX instructions to prevent attempting to execute a RX or WX while the modules is busy.

Communication error – on when a communications error occurs. This error automatically clears when another RX or WX instruction executes.

All D4-454 CPUs							
		SP112	CPU port busy Port 1	SP114	CPU port busy Port 2	SP116	CPU port busy Port 3
		SP113	Comm error Port 1	SP115	Comm error Port 2	SP117	Comm error Port 3
Local Base		**Expansion Base #1**		**Expansion Base #2**		**Expansion Base #3**	
SP120	Module busy Slot 0	SP140	Module Busy Slot 0	SP160	Module busy Slot 0	SP200	Module busy Slot 0
SP121	Comm error Slot 0	SP141	Comm error Slot 0	SP161	Comm error Slot 0	SP201	Comm error Slot 0
SP122	Module busy Slot 1	SP142	Module busy Slot 1	SP162	Module busy Slot 1	SP202	Module busy Slot 1
SP123	Comm error Slot 1	SP143	Comm error Slot 1	SP163	Comm error Slot 1	SP203	Comm error Slot 1
SP124	Module busy Slot 2	SP144	Module busy Slot 2	SP164	Module busy Slot 2	SP204	Module busy Slot 2
SP125	Comm error Slot 2	SP145	Comm error Slot 2	SP165	Comm error Slot 2	SP205	Comm error Slot 2
SP126	Module busy Slot 3	SP146	Module busy Slot 3	SP166	Module busy Slot 3	SP206	Module busy Slot 3
SP127	Comm error Slot 3	SP147	Comm error Slot 3	SP167	Comm error Slot 3	SP207	Comm error Slot 3
SP130	Module busy Slot 4	SP150	Module busy Slot 4	SP170	Module busy Slot 4	SP210	Module busy Slot 4
SP131	Comm error Slot 4	SP151	Comm error Slot 4	SP171	Comm error Slot 4	SP211	Comm error Slot 4
SP132	Module busy Slot 5	SP152	Module busy Slot 5	SP172	Module busy Slot 5	SP212	Module busy Slot 5
SP133	Comm error Slot 5	SP153	Comm error Slot 5	SP173	Comm error Slot 5	SP213	Comm error Slot 5
SP134	Module busy Slot 6	SP154	Module busy Slot 6	SP174	Module busy Slot 6	SP214	Module busy Slot 6
SP135	Comm error Slot 6	SP155	Comm error Slot 6	SP175	Comm error Slot 6	SP215	Comm error Slot 6
SP136	Module busy Slot 7	SP156	Module busy Slot 7	SP176	Module busy Slot 7	SP216	Module busy Slot 7
SP137	Comm error Slot 7	SP157	Comm error Slot 7	SP177	Comm error Slot 7	SP217	Comm error Slot 7