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# Yaskawa SMC – Serial Port and TCP

## Information Sheet for Crimson v2.0

### Compatible Devices

- SMC 3010, 4000, 2000

### Verified Device

- 3010

### Accessible Data

| ABBR | ACTION | ACTION TYPE |
|---|---|---|
| AB | Abort Motion and Program | COMMAND |
| ABA | Abort Motion Only | COMMAND |
| AC | Acceleration | DATA R/W |
| AD | After Distance | DATA R/W |
| AF | Enable Digital Feedback | Send 0 to AXIS |
| AFA | Enable Analog Feedback | Send 1 to AXIS |
| AI | After Input | DATA R/W |
| AL | Arm Latch | COMMAND |
| AM | After Motion | COMMAND |
| AO | Analog Output | DATA R/W |
| AP | After Absolute Postion | DATA R/W |
| AR | After Relative Distance | DATA R/W |
| AS | At Speed | COMMAND |
| AT | At Time | DATA R/W |
| BG | Begin Motion | COMMAND |
| BL | Reverse Software Limit | DATA R/W |
| BN | Burn | COMMAND |
| BP | Burn Program | COMMAND |
| BV | Burn Variables | COMMAND |
| CB | Clear Bit | DATA R/W |
| CD | Contour Data | DATA R/W |
| CE | Configure Encoder | DATA R/W |
| CH | Connect Handle | COMMAND |
| CHA | Connect Handle - Axis | COMMAND DATA |
| CHB | Connect Handle - Send | COMMAND DATA |

| | | |
|---|---|---|
| CHC | Connect Handle - Receive | COMMAND DATA |
| CM | Contour Mode | COMMAND |
| DC | Deceleration | DATA R/W |
| DE | Dual (Auxiliary) Encoder Position | DATA R/W |
| DP | Define Position | DATA R/W |
| DT | Delta Time | DATA R/W |
| DV | Dual Velocity Enable (Dual Loop) | DATA R/W |
| EA | ECAM Master Axis | COMMAND |
| EB | Enable ECAM Mode Enable | DATA R/W |
| EC | ECAM Counter | DATA R/W |
| EG | ECAM Engage | DATA R/W |
| EM | ECAM Cycle | DATA R/W |
| EQ | ECAM Quit (Disengage) | DATA R/W |
| ER | Error Limit | DATA R/W |
| FA | Acceleration Feed Forward | DATA R/W |
| FE | Find Edge | COMMAND |
| FI | Find Index | COMMAND |
| FL | Forward Software Limit | DATA R/W |
| FV | Velocity Feed Forward | DATA R/W |
| GA | Master Axis for Gearing | COMMAND |
| GR | Gear Ratio | DATA R/W |
| HM | Home | COMMAND |
| HX | Halt Task Execution | COMMAND (Note 1) |
| IA | Ethernet IP Address (Not Available in TCP) | DATA R/W |
| IH | Open Internet Handle | COMMAND |
| IHA | Internet Handle - Handle | COMMAND DATA |
| IHB | Internet Handle - IP | COMMAND DATA |
| IHC | Internet Handle - Port | COMMAND DATA |
| IHD | Internet Handle - Protocol | COMMAND DATA |
| IHE | Internet Handle - Terminate | COMMAND |
| IL | Integrator Limit | DATA R/W |
| IP | Increment Position | DATA R/W |
| IT | Independent Time Constant | DATA R/W |
| JG | Jog | DATA R/W |
| KD | Derivative Constant | DATA R/W |
| KI | Integrator | DATA R/W |
| KP | Proportional Constant | DATA R/W |
| MC | Motion Complete (In Position) | COMMAND |
| MF | Forward Motion to Position | DATA R/W |
| MM | Master Modulus | DATA R/W |
| MO | Motor Off | COMMAND/STATUS |
| MR | Reverse Motion to Position | DATA R/W |
| MT | Motor Type | DATA R/W |
| NA | Number of Axes | DATA R/W |
| OB | Output Bit | BIT WRITE |

| | | |
|---|---|---|
| OE | Off on Error - Enable/Disable | DATA R/W |
| OF | Offset | DATA R/W |
| OP | Output Port | DATA R/W |
| PA | Position Absolute | DATA R/W |
| PR | Position Relative | DATA R/W |
| RL | Report Latched Position | READ DATA |
| RS | Reset | DATA R/W |
| SB | Set Bit | DATA R/W |
| SH | Servo Here | COMMAND |
| SP | Speed | DATA R/W |
| ST | Stop | COMMAND |
| TB | Tell Status Byte | READ DATA |
| TC | Tell Error Code | READ DATA |
| TD | Tell Dual Encoder | READ DATA |
| TE | Tell Error | READ DATA |
| TI | Tell Inputs | READ DATA |
| TL | Torque Limit | DATA R/W |
| TM | Time Command | DATA R/W |
| TP | Tell Position | READ DATA |
| TS | Tell Switches | READ DATA |
| TT | Tell Torque | READ DATA |
| TV | Tell Velocity | READ DATA |
| TW | Timeout for In Position (MC) | DATA R/W |
| VA | Vector Acceleration | DATA R/W |
| VD | Vector Deceleration | DATA R/W |
| VE | Vector Sequence End | READ DATA |
| VR | Vector Speed Ratio | DATA R/W |
| VS | Vector Speed | DATA R/W |
| VT | Vector Time Constant | DATA R/W |
| WC | Wait for Contour Data | COMMAND |
| WT | Wait | DATA R/W |
| PF | Position Format | DATA R/W |
| VF | Variable Format | DATA R/W |
| XQ | Execute Program | COMMAND (Note 1) |
| YP | User Variable YP | DATA R/W |
| YQ | User Variable YQ | DATA R/W |
| YR | User Variable YR | DATA R/W |
| YS | User Variable YS | DATA R/W |
| YT | User Variable YT | DATA R/W |
| YU | User Variable YU | DATA R/W |
| YV | User Variable YV | DATA R/W |
| YW | User Variable YW | DATA R/W |
| YX | User Variable YX | DATA R/W |
| YY | User Variable YY | DATA R/W |

**ACTION TYPE:**

1. COMMAND – A new value written to these instructions will execute the command.
2. DATA R/W – Reads the current value and will send a new value.
3. READ DATA – Reads the current value. Ignores any write attempt.
4. COMMAND DATA – Reads data that is stored in HMI. Stores written data in HMI for retrieval when the related command is executed. E. g., the operator writes to CHA, CHB, and CHC. The HMI will store the data, and the values will be transmitted to the SMC only when the CH command is executed.
5. COMMAND/STATUS – Executes the command when a new value is written to it, reads the current status.
6. Send 0/1 to Axis – Executes the command on the selected Axis.
7. BIT WRITE – Clears the configured Output bit if the written data is 0, otherwise sets the bit.

"Reading" any COMMAND will set the item to 0, except as described in Note 1, below.

Note 1: HX and XQ are commands that accept a line number (<32767) as a data input. It is recommended that these two commands be selected with Access set to Read and Write, when declared as a variable. The driver will then set the value of these to –1, so that the command will be executed every time a valid line number is sent.

## User Variables

User Variables YP through YY are selectable. If more are needed, it is possible to use one variable as an index, and another for the data. Use the data comparison functions of the software to route the data properly. For example, VariableArray[YY] = YX, will provide as many user variables as needed.

In many cases, a clever programmer might be able to use higher bits of the transferred data word to indicate the source of the data in the lower bits.
For example, VariableArray[(YY & 0xFF000000)>>24] = YY & 0x00FFFFFF, will allow 256 independent results of values less than hex 1000000 (decimal 16777216).

In either case, use "On Update" to transfer the proper values to the proper locations.

## TCP Information

The G3 Ethernet Port must be manually configured to a fixed IP. When the Protocol is selected, the SMC must be configured to its internal IP. The programmer may use the 232 port, with the IA command, to set that IP, code the IP in the SMC program, or use the Boot P utility of the Yterm software.

## Cable Information

| G3 RS232 Port | SMC 232 Port |
|---|---|
| TxD - 5 | RxD – 3 |
| RxD - 2 | TxD – 2 |
| CTS – 6 | CTS-OUT 4 |
| RTS – 1 | CTS-IN 1 |
| 0V – 3 and/or 4 | 5 |

For Multi-Axis Control, with an SMC as a Master that controls other SMC's, the connection MUST be made as above, or improper operation may occur.