Meccano MAX – command sequences.

1. Starting the Motors

    … Starting …

    FF FE FE FE FE A1 - ~~
    FF FE FE FE FE A1 - ~~
    FF FE FE FE FE A2 - ~~
    FF FE FE FE FE A3 - ~~
    FF FE FE FE FE A0 - fe   Module 0 replies with 0xfe
    FF FE FE FE FE A1 - ~~
    FF FE FE FE FE A2 - ~~
    FF FE FE FE FE A3 - ~~
    FF FE FE FE FE A0 - fe   Module 0 repeats reply
    FF FC FE FE FE 81 - ~~   Query to module 0 for type code
    FF FC FE FE FE 82 - ~~
    FF FC FE FE FE 83 - ~~
    FF FC FE FE FE 80 - 05   Module 0 replies with type code 5
    FF FC FE FE FE 81 - fe   Module 1 replies with 0xfe
    FF FC FE FE FE 82 - ~~
    FF FC FE FE FE 83 - ~~
    FF FC FE FE FE 80 - 05
    FF FC FC FE FE 61 - 05   Query to Module 1 for type – immediate reply of 5
    FF FC FC FE FE 62 - ~~
    FF FC FC FE FE 63 - ~~
    FF FC FC FE FE 60 - 05
    FF 00 FC FE FE 91 - 05
    FF 00 FC FE FE 92 - ~~
    FF 00 FC FE FE 93 - ~~
    FF 00 FC FE FE 90 - 02
    FF 00 00 FE FE C1 - 00
    FF 00 00 FE FE C2 - ~~
    FF 00 00 FE FE C3 - ~~
    FF 00 00 FE FE C0 - 02
    FF 00 00 FE FE C1 - 00
    FF 00 00 FE FE C2 - ~~
    FF 00 00 FE FE C3 - ~~
    FF 00 00 FE FE C0 - 02
    FF 00 00 FE FE C1 - 00

2. Starting the Ultrasonic Sensor

    … Starting …

    FF FE FE FE FE A1 - ~~
    FF FE FE FE FE A1 - ~~

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FF FE FE FE FE A2  - ~~
FF FE FE FE FE A3  - ~~
FF FE FE FE FE A0  - fe              Module 0 replies with 0xfe
FF FE FE FE FE A1  - ~~
FF FE FE FE FE A2  - ~~
FF FE FE FE FE A3  - ~~
FF FE FE FE FE A0  - fe
FF FC FE FE FE 81  - ~~              Query to module 0 for type code
FF FC FE FE FE 82  - ~~
FF FC FE FE FE 83  - ~~
FF FC FE FE FE 80  - 04              Module 0 replies with type code 4
FF FC FE FE FE 81  - ~~
FF FC FE FE FE 82  - ~~
FF FC FE FE FE 83  - ~~
FF FC FE FE FE 80  - 04              Module 0 repeats reply
FF FC FE FE FE 81  - ~~
FF FC FE FE FE 82  - ~~
FF FC FE FE FE 83  - ~~
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3. Starting the LED Array

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... Starting ...
FF FE FE FE FE A1  - ~~
FF FE FE FE FE A1  - ~~
FF FE FE FE FE A2  - ~~
FF FE FE FE FE A3  - ~~
FF FE FE FE FE A0  - fe              Module 0 replies with 0xfe
FF FE FE FE FE A1  - ~~
FF FE FE FE FE A2  - ~~
FF FE FE FE FE A3  - ~~
FF FE FE FE FE A0  - fe              Module 0  repeats reply
FF FC FE FE FE 81  - ~~
FF FC FE FE FE 82  - ~~
FF FC FE FE FE 83  - ~~
FF FC FE FE FE 80  - 06              Module 0 replies with type code 6
FF FC FE FE FE 81  - ~~
FF FC FE FE FE 82  - ~~
FF FC FE FE FE 83  - ~~
FF FC FE FE FE 80  - 06              Module 0  repeats reply
FF FC FE FE FE 81  - ~~
FF FC FE FE FE 82  - ~~
FF FC FE FE FE 83  - ~~
FF 00 FF 00 FF 00  - ~~

<  80 00 00 FF 00 00  - ~~
   00 00 00 00 FF 00  - ~~
    00 FF 00 FF FF FF  - 00     >
```
 Commands to the array from this point use a PWM format similar to that used for the

response from module to Meccabrain. Pulse period is 430 us, with a high pulse width >200 us for LOW (LED off) and < 200 us for HIGH (LED on). There is a short start bit and some sort of check-sum. Data bits are sent starting from the bottom left corner of the array (as viewed from the front) and moving up, then right. My sniffer looks for a HIGH > 12 ms, then tries to read the information as a serial string, hence the results above.

4. Starting servos

        ... Starting ...
        FF FE FE FE FE A1 - ~~
        FF FE FE FE FE A1 - ~~
        FF FE FE FE FE A2 - ~~
        FF FE FE FE FE A3 - ~~
        FF FE FE FE FE A0 - fe   Module 0 replies with 0xfe
        FF FE FE FE FE A1 - ~~
        FF FE FE FE FE A2 - ~~
        FF FE FE FE FE A3 - ~~
        FF FE FE FE FE A0 - fe
        FF FC FE FE FE 81 - ~~   Query to module 0 for type code
        FF FC FE FE FE 82 - ~~
        FF FC FE FE FE 83 - ~~
        FF FC FE FE FE 80 - 01   Module 0 replies with type code 1
        FF FC FE FE FE 81 - fe   Module 1 replies with 0xfe
        FF FC FE FE FE 82 - ~~
        FF FC FE FE FE 83 - ~~
        FF FC FE FE FE 80 - 01
        FF FC FC FE FE 61 - 01   Module 1 replies with type code 6
        FF FC FC FE FE 62 - ~~
        FF FC FC FE FE 63 - ~~
        FF FC FC FE FE 60 - 01
        FF FA FC FE FE 41 - 01   Data value 0xFA transmitted to Module 0
        FF FA FC FE FE 42 - ~~
        FF FA FC FE FE 43 - ~~
        FF FA FC FE FE 40 - 7d
        FF FA FA FE FE 21 - 7c   Data value 0xFA transmitted to Module 1
        FF F4 F4 FE FE 52 - ~~   Data value 0xF4 transmitted to Modules 0 & 1
        FF F4 F4 FE FE 53 - ~~
        FF 7D 7C FE FE 60 - 7c   Data value 0x7D transmitted to Modules 0 and 0x7C to
        Module 1
        FF F9 F9 FE FE 01 - 7c
        FF 08 08 FE FE E2 - ~~
        FF 7D 7C FE FE 63 - ~~
        FF 7C 7C FE FE 50 - 7c
        FF 7C 7C FE FE 51 - 7c
        FF 7C 7C FE FE 52 - ~~
        FF 7D 7D FE FE 73 - ~~
        FF 7D 7D FE FE 70 - 7c
        FF 7D 7D FE FE 71 - 7c

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                 FF 7D 7D FE FE 72  - ~~
                 FF 7E 7E FE FE 93  - ~~
                 FF 7E 7E FE FE 90  - 7c
                 FF 7E 7E FE FE 91  - 7c


5.  Starting with motors and ultrasonic sensor in a single channel

                 ... Starting ...
                 FF FE FE FE FE A1  - ~~
                 FF FE FE FE FE A1  - ~~
                 FF FE FE FE FE A2  - ~~
                 FF FE FE FE FE A3  - ~~
                 FF FE FE FE FE A0  - fe            Module 0 replies with 0xfe
                 FF FE FE FE FE A1  - ~~
                 FF FE FE FE FE A2  - ~~
                 FF FE FE FE FE A3  - ~~
                 FF FE FE FE FE A0  - fe            Module 0 repeats reply
                 FF FC FE FE FE 81  - ~~            Query for type of Module 0
                 FF FC FE FE FE 82  - ~~
                 FF FC FE FE FE 83  - ~~
                 FF FC FE FE FE 80  - 05            Module 0 replies with type code 5
                 FF FC FE FE FE 81  - fe            Module 1 replies with 0xfe
                 FF FC FE FE FE 82  - ~~
                 FF FC FE FE FE 83  - ~~
                 FF FC FE FE FE 80  - 05
                 FF FC FC FE FE 61  - 05            Query for type code of Module 1. Module 1 replies with 5.
                 FF FC FC FE FE 62  - fe            Module 2 replies with 0xfe
                 FF FC FC FE FE 63  - ~~
                 FF FC FC FE FE 60  - 05
                 FF 00 FC FC FE 71  - 05
                 FF 00 FC FC FE 72  - 04            Module 2 replies with type code 4
                 FF 00 FC FC FE 73  - ~~
                 FF 00 FC FC FE 70  - 4f
                 FF 00 00 FC FE A1  - 00
                 00 00 FC FE A2 40  - ~~
                 FF 00 00 FC FE A0  - 4f
                 FF 00 00 00 FE D1  - 00
                 FF 00 00 00 FE D2  - 04
                 FF 00 00 00 FE D3  - ~~
                 FF 00 00 00 FE D0  - 4f
                 FF 00 00 00 FE D1  - 00
                 FF 00 00 00 FE D2  - 04
                 FF 00 00 00 FE D3  - ~~
                 FF 00 00 00 FE D0  - 4f
                 FF 00 00 00 FE D1  - 00
                 FF 00 00 00 FE D2  - 04
                 FF 00 00 00 FE D3  - ~~
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