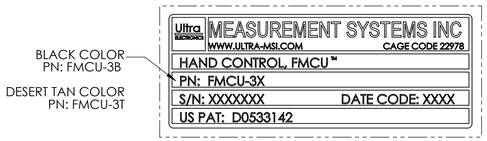
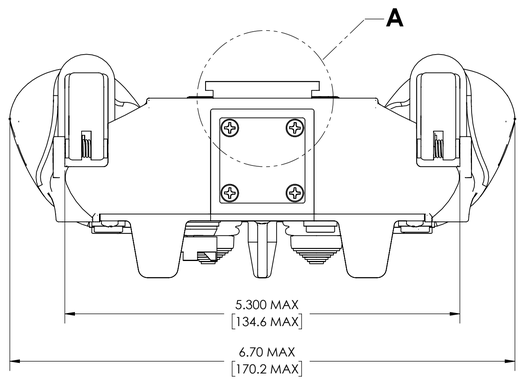
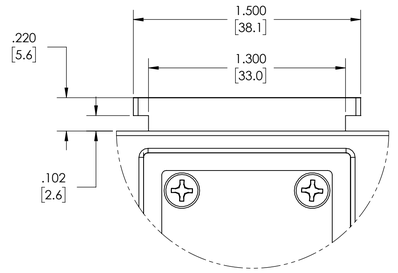
REVISION			
REV	DESCRIPTION OF CHANGE	APPROVED BY	DATE
A	REVISED PER ECO 50295	R. PAQUETTE	04/23/19



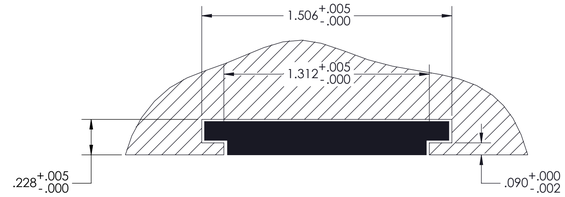
MSI FMCU IS REGISTERED TRADE MARK PER FEDERAL REGISTRATION NO. 3,076,560 US PAT. D0533142

DETAIL B
SCALE 2 : 1

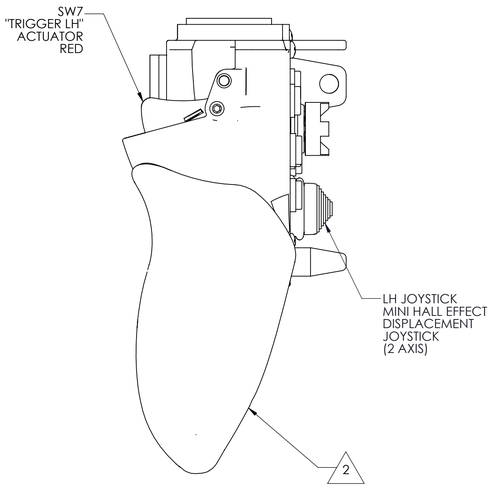


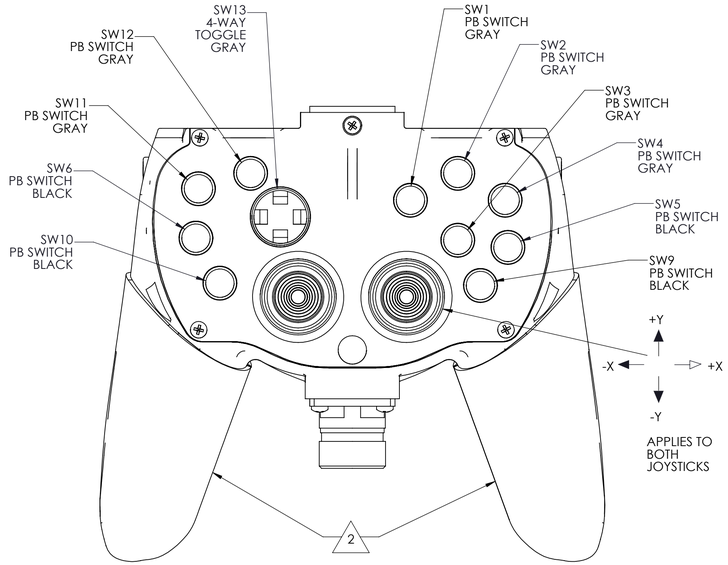


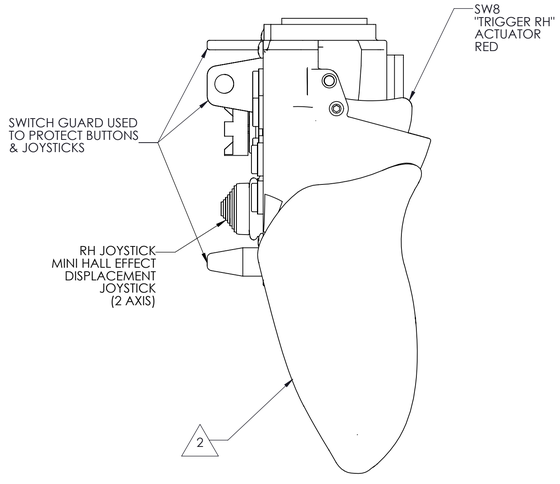
DETAIL A
SCALE 2:1

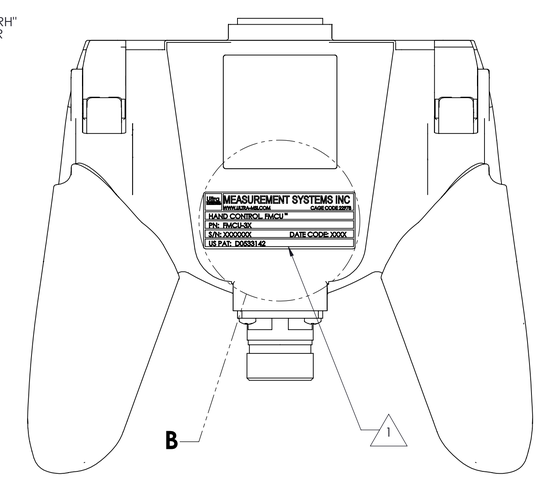


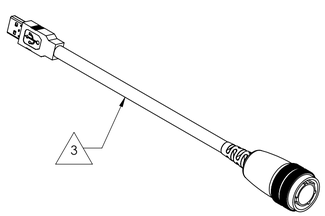
SUGGESTED MOUNTING CONFIGURATION
SCALE 2:1

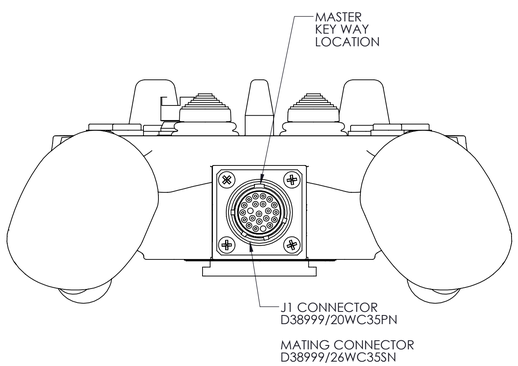












NOTES:

1. LOCATE LABEL APPROXIMATELY AS SHOWN.
2. GRIP HANDLES COVERED W/ PLASTISOL PER MIL-P-20689 AS SHOWN.
3. FMCU UNIT TO BE SHIPPED WITH 6FT USB CABLE.
   (FOR REPLACEMENT CABLE: MSI PART # 6826912)

VENDOR ITEM CONTROL DRAWING

FMCU-3T	DESERT TAN
FMCU-3B	BLACK
PART NUMBER	**FINISH** (SEE SPEC 1.3, SHEET 2)

PROPRIETARY TO ULTRA ELECTRONICS - MEASUREMENT SYSTEMS INC UNAUTHORIZED COPYING IS NOT ALLOWED.

DRAWING REQUIREMENTS	
CONFIGURATION CONTROLLED	N
FLIGHT CRITICAL PARTS	N
REACH COMPLIANT	N
WEEE COMPLIANT	N
RoHS COMPLIANT	N

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE INCHES
DECIMAL = .XX±0.01 , .XXX±0.005 ANGLE: 0°30'
REMOVE ALL BURRS AND BREAK SHARP EDGES
.005 TO .010.
SURFACE FINISH:
THIRD ANGLE PROJECTION

MATERIAL: GRIP ALUMINUM ALLOY
FINISH: SEE NOTE 1.3

DRAWING INTERPRETATION PER: ASME Y14.5M 1994

DRAWN	ENS	DATE 10/16/13
ME CHECKED	BJM	DATE 11/20/13
EE CHECKED	LWY	DATE 11/20/13
APPROVED	LWY	DATE 11/20/13

Ultra ELECTRONICS — MEASUREMENT SYSTEMS INC

TITLE: HAND CONTROL GRIP W/ USB OUTPUT

SIZE	CAGE CODE NO.	DWG NUMBER	REV
D	22978	FMCU-3X	A

SCALE	1:1	SOLIDWORKS	SHEET	1 OF 2

NEXT ASSY: FMCU-3X
D

SPECIFICATIONS

1. MECHANICAL

1.1 DIMENSIONS IN PARENTHESES ( ) DENOTE MILLIMETERS, KILOGRAMS, OR NEWTONS.

1.2 WEIGHT: APPROX 1.5 LBS (.68 KG)

1.3 FINISH:

A) GRIP:
FMCU-3B: COLOR BLACK, NO. 37038 PER FED-STD-595.

FMCU-3T: COLOR DESERT TAN, NO. 33446 PER FED-STD-595.

B) TRIGGER ACTUATOR: POS. "SW7" AND "SW8", COLOR NO. 21136 RED.

C) SWITCH KNOBS:
"LH JOYSTICK" AND "RH JOYSTICK": BLACK.

1.4 SWITCH CHARACTERISTICS:

1.4.1 SWITCH OPERATING FORCES:
A) POS. "SW1","SW2","SW3","SW4","SW5","SW6","SW9","SW10","SW11" AND "SW12": PUSH BUTTON SWITCH, 1.70±.50 LBS (7.6±2.2 N).
B) POS. "SW13": 4 WAY TOGGLE, .75±.25 LBS (3.3±1.1 N).
C) "LH JOYSTICK" AND "RH JOYSTICK": MINI HALL EFFECT DISPLACEMENT JOYSTICKS, .70±.11 LBS (3.1±.50 N).
D) POS. TRIGGER, 1.70±.50 LBS (7.6±2.2 N).

1.4.2 ACTUATION TRAVEL:
A) POS. "SW1","SW2","SW3","SW4","SW5","SW6","SW9","SW10","SW11", AND "SW12": .08 IN (2.0 MM) MAX.
B) POS. "SW13": ±10° MAX FROM CENTER.
C) POS. "LH JOYSTICK" AND "RH JOYSTICK": ±25° MAX FROM CENTER (50° TOTAL).
D) POS. TRIGGER .08 IN (2.0 MM) MAX.

1.5 WIRES: 26 AWG, PER MIL-W-80144/12, UNLESS OTHERWISE SPECIFIED.
3/64" TINNED COPPER FLAT BRAID FOR CHASSIS GROUND

1.6 (REF) SWITCH HEIGHT ABOVE GRIP TOLERANCE ±.05 (1.3)
(MEASURED FROM CENTERLINE OF SWITCH)

	SW1	SW2	SW3	SW4	SW5	SW6	SW9	SW10	SW11	SW12	SW13
IN	.168	.168	.168	.168	.168	.168	.168	.168	.168	.168	.470
MM	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	11.94

	LH JOYSTICK	RH JOYSTICK
IN	0.613	0.613
MM	15.6	15.6

2. ELECTRICAL

2.1 USB OPERATION MODULE.

NOTE: CALIBRATION PROCEDURE:

THE UNIT IS FACTORY CALIBRATED. IF THE RE-CALIBRATION IS REQUIRED, FOLLOW THE CALIBRATION PROCEDURE IN 2.2.

2.2 CALIBRATION PROCEDURE FOR USB

a) PRESS AND HOLD SW2 AND SW1.
b) CONNECT THE USB TO UUT AND HOSTS USB PORT.
c) RELEASE SWITCHES SW2 AND SW1.
d) WAIT SEVEN (7) SECONDS MINIMUM.
e) MOVE JOYSTICK TO THE MAXIMUM POSITIONS IN Y,-Y,X,-X AXES.
f) PRESS AND HOLD SW2 AND SW1.
g) WAIT ONE (1) SECOND MINIMUM.
h) RELEASE SWITCHES SW2 AND SW1.
i) DISCONNECT THE UUT FROM THE HOSTS USB PORT.
j) UNIT IS CALIBRATED AND READY FOR USE WHEN RECONNECTED.

2.3 SOFTWARE DESCRIPTION USB

CONTROL GRIP DEVICES	USB USAGE PAGE	USB USAGE ID	USB USAGE NAME
LH JOYSTICK X-AXIS	0X1	30	X
LH JOYSTICK Y-AXIS	0X1	31	Y
RH JOYSTICK X-AXIS	0X1	33	Rx
RH JOYSTICK Y-AXIS	0X1	34	Ry
POS. SW1-PB	0X9	1	BUTTON 1
POS. SW2-PB	0X9	2	BUTTON 2
POS. SW3-PB	0X9	3	BUTTON 3
POS. SW4-PB	0X9	4	BUTTON 4
POS. SW5-PB	0X9	5	BUTTON 5
POS. SW6-PB	0X9	6	BUTTON 6
POS. SW7 TRIGGER LH	0X9	7	BUTTON 7
POS. SW8 TRIGGER RH	0X9	8	BUTTON 8
POS. SW9-PB	0X9	9	BUTTON 9
POS. SW10-PB	0X9	10	BUTTON 10
POS. SW11-PB	0X9	11	BUTTON 11
POS. SW12-PB	0X9	12	BUTTON 12
POS. SW13-UP	0X9	13	BUTTON 13
POS. SW13-DN	0X9	14	BUTTON 14
POS. SW13-LT	0X9	15	BUTTON 15
POS. SW13-RT	0X9	16	BUTTON 16

3. RELIABILITY / ENVIRONMENTAL (DESIGN TO MEET)

3.1 PROJECTED LIFE

A) X-Y MECHANISM 1,000,000 CYCLES MIN.
B) SWITCHES 40,000 CYCLES MIN.

3.2 ALTITUDE:
OPERATING, 15,000 FT. (8.3 PSIA)
NON-OPERATING, 50,000 FT. MAX (2.73 PSIA)
MIL-STD-810F, METHOD 500.4, PROCEDURE II

3.3 VIBRATION:
MIL-STD-810F, METHOD 514.5, PROCEDURE II, FIGURE 514.5C-5
TRANSPORTATION CATEGORY - LOOSE CARGO

3.4 BASIC SHOCK:
MIL-STD-810F, METHOD 516.5, PROCEDURE IV, TABLE 516.5-VI
TRANSIT DROP - 24 in. (61 cm), TOTAL OF 8 DROPS.

3.5 TEMPERATURE:
HIGH OPERATION: MIL-STD-810F, METHOD 501.4, PROCEDURE I & PROCEDURE II, +131.0°F (+55°C). CATEGORY A1 (HOT DRY)
LOW OPERATION: MIL-STD-810F, METHOD 502.4, PROCEDURE I & PROCEDURE II,
-40°F (-40°C). CATEGORY C2 (COLD)

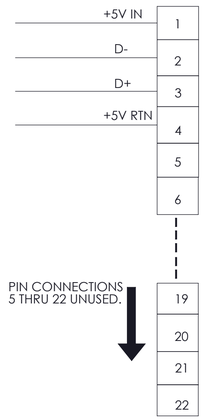
3.6 RAIN:
MIL-STD-810F, METHOD 506.4, PROCEDURE I, FIGURE 506.4-1
PROCEDURE I - RAIN AND BLOWING RAIN.

3.7 HUMIDITY:
MIL-STD-810F, METHOD 507.4, 240 HOURS, +86°F TO +140°F
(+30°C TO +60°C)
5% TO 100% RELATIVE HUMIDITY

3.8 SAND AND DUST:
MIL-STD-810F, METHOD 510.4, PROCEDURE II
PROCEDURE II - BLOWING SAND
DURATION: 90 MINUTES MINIMUM PER VULNERABLE FACE.

J1 OUTPUT CONNECTOR
D38999/20WC35PN

MATING CONNECTOR
D38999/26WC35SN



CONNECTOR PINOUT LOCATION

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Ultra ELECTRONICS	MEASUREMENT SYSTEMS INC	SIZE D	CAGE CODE NO. 22978	DWG NUMBER FMCU-3X REV A
		SCALE 1:1	SOLIDWORKS	SHEET 2 OF 2

REV A
FMCU-3X
D