9711-26070-0004 Rev -

ARMOR X7
FLEXSPACE™ UTILIZATION GUIDE

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1 Scope

This document provides the preliminary information and guidance you will need to plan your custom installation for the X7. The final design must meet specific physical, electrical and environmental standards necessary to ensure your X7 complies with all certifications and continues to function as a rugged and reliable portable computer.

Once you have followed this guide and determined the requirements for your project, please contact DRS Tactical Systems toll free at 1-888-872-1100 and we will be happy to work with you to successfully complete the installation.

2 What is Flexspace™?

"Flexspace" is additional space within the X7 that has a flexible interface. This interface allows you to install custom cards and modules to extend the capabilities of your ARMOR product. There are actually two areas of flexspace available in the X7: (1) an internal flexspace located inside the rear compartment just beneath the cooling register and (2) a battery-shaped adapter that takes the place of the right side (#2) battery.

3 Internal Flexspace

The internal flexspace is shown in Figure 1. It includes the area bounded in red and can be a circuit board or module that will connect to the X7 using one of two different interface adapters: mini PCIe or PCI/USB. Each interface adapter plugs into a 60-pin flexspace connector which is mounted to the motherboard.

The example in Figure 1 shows a WWAN card and SIM socket mounted to a currently available circuit board and connected to the interface connector with a mini-PCIe adapter.

MINI PCI-E ADAPTER **SIM CARD SOCKET** **WWAN CARD**
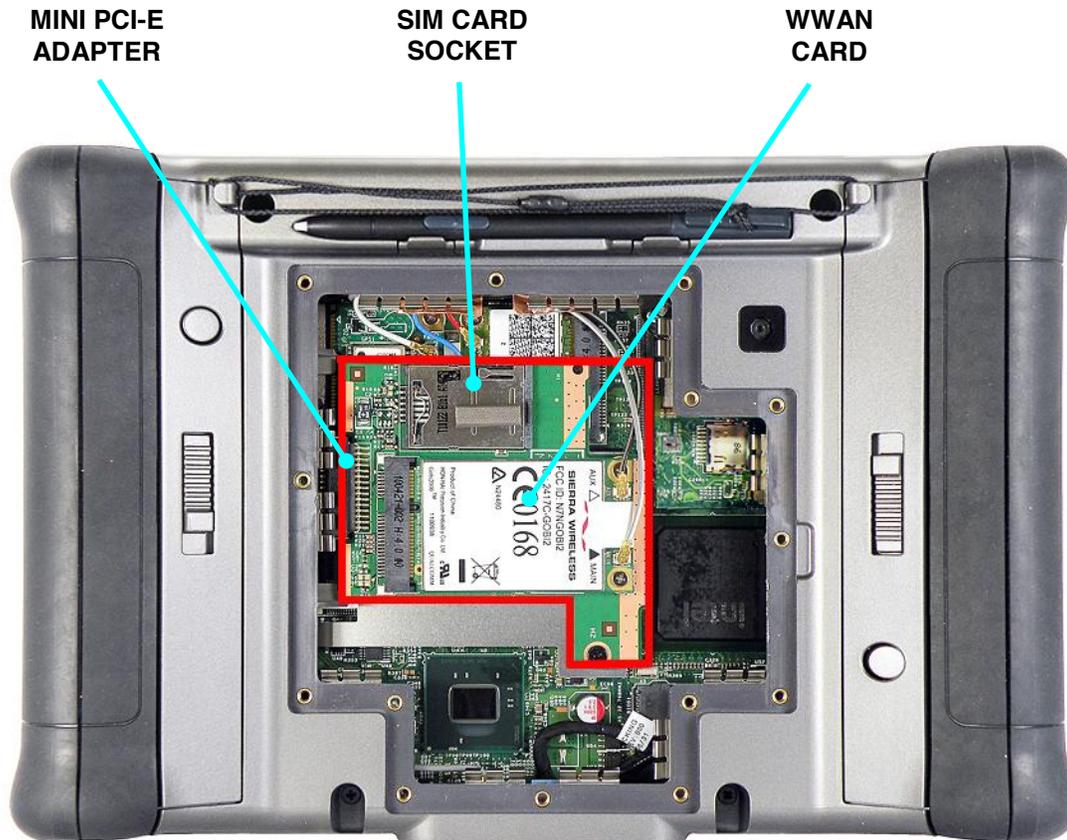
Figure 1. Rear Compartment Flexspace

3.1 Internal Flexspace Interface

The internal flexspace interface connector is a 50-pin connector (or larger) connector that provides the following capabilities:

- +5V at 1A (total power)
- +3.3V at 1A (total power)
- 2x USB 2.0 Port
- 4x Bi-Directional (GND/Open) Discretes to EC Processor
- 2x Expansion Module Detect Discrete (GND/Open Input)
- PCI Express X1 Channel
- RS-232 Serial Port with Hardware Handshake

Error! Reference source not found. shows the current pinout for the FlexBoard interface connector.

Table 1. Internal Flexspace Interface Connector Pinout

FlexSpace Motherboard Pin Definitions			
Signal	Pin	Pin	Signal
+5V1A_OUT	1	2	+5V1A_OUT
+5V_RET	3	4	+5V_RET
GPIO0	5	6	GPIO1
USB0-	7	8	USB0+
NC	9	10	NC
GND	11	12	GND
SMCLK	13	14	SMDAT
PCIE_WAKE#	15	16	NC
GND	17	18	GND
CLK_PCIE_Flex	19	20	CLK_PCIE_Flex#
GND	21	22	GND
PCIE_FLEX_RNX3	23	24	PCIE_FLEX_RXP3
GND	25	26	GND
PCIE_FLEX_TXN3	27	28	PCIE_FLEX_TXP3
Serial_RXD_2	29	30	Serial_TXD_2
Serial_DTR#_2	31	32	Serial_DSR#_2
Serial_CTS#_2	33	34	Serial_RTS#_2
CRT_R	35	36	CRT_AGND
CRT_G	37	38	CRT_AGND
CRT_B	39	40	CRT_AGND
CRT_HSYNC_OUT	41	42	CRT_VSYNC_OUT
NC	43	44	GND
CRT_DDCCLK_OUT	45	46	CRT_DDCDATA_OUT
ANALOG_AGND	47	48	ANALOG_AGND
Flex_MIC_IN	49	50	Flex_MIC_DT#
Flex_HP_OUT_L	51	52	Flex_HP_OUT_R
FLX_EXP_DET#1	53	54	FLX_EXP_DET#2
FLX_EXP_GPIO2	55	56	FLX_EXP_GPIO3
GND	57	58	GND
3D3V_Flex_S0	59	60	3D3V_Flex_S0

3.2 Internal Flexspace Dimensions

Figure 2 shows the current horizontal and vertical dimensions of the X7 internal flexspace. Increased vertical dimensions can be accommodated with a custom modification to the cooling register/cover.
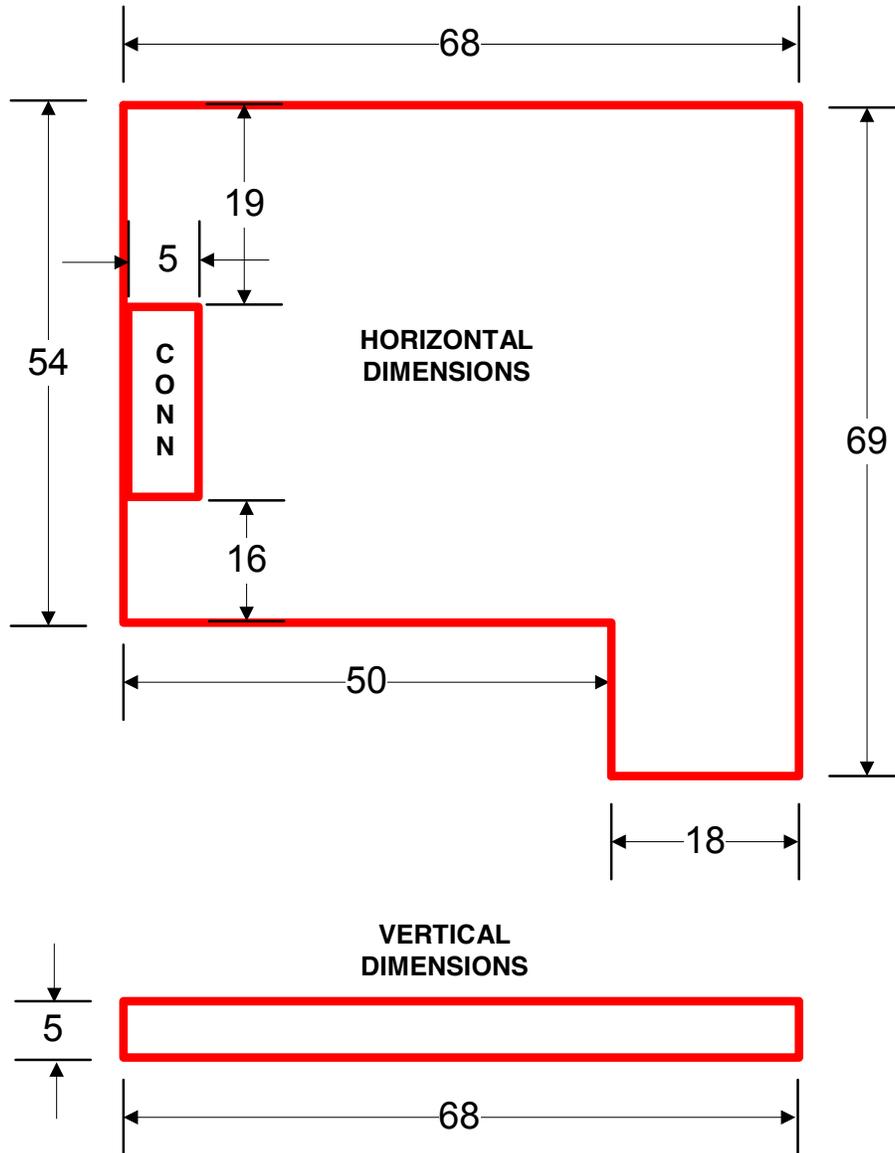
Figure 2. Internal Flexspace Dimensions

NOTE: All dimensions are in mm
All measurements are approximate

4 Battery Adapter Flexspace

The battery adapter flexspace is contained in an X7 battery shell that is equipped with an expansion interface connector instead of a battery connector. The right battery bay has the mating flexspace connector and the battery adapter is used in place of the right battery.

The battery flex space is basically the same space that is inside the battery case without the cells. The interfacing device must mount like the battery (using the same attachment features) but can be expanded to fit your needs.

A sample flexspace adapter with a custom external connector module is illustrated in the concept drawings in Figure 3.

FLEXSPACE INTERFACE CONNECTOR

CUSTOM EXTERNAL CONNECTOR MODULE

Figure 3. ARMOR X7 Battery Adapter Flexspace Concept

4.1 Battery Flexspace Interface

The battery adapter flexspace interface connector is an 18-pin connector that provides the following capabilities:

- +5V at 1A (total power)
- +3.3V at 1A (total power)
- 2x USB 2.0 Port
- 2x Bi-Directional (GND/Open) Discretes to EC Processor
- Expansion Module Detect Discrete (GND/Open Input)
- Expansion Module Enable Discrete (GND/Open Output)

Table 2 – Battery Flexspace Interface Connector

Battery Flexspace Interface Pin Definitions			
Signal	Pin	Pin	Signal
GND	1	2	GND
USB_HUB_BAT_EXP_PN4_R	3	4	USB_HUB_BAT_EXP_PN3_R
BAT_EXP_GPIO1	5	6	GND
GND	7	8	USB_HUB_BAT_EXP_PP4_R
USB_HUB_BAT_EXP_PP3_R	9	10	BAT_EXP_GPIO0
BAT_EXP_DET#	11	12	BAT_EXP_EN
3D3V_S0	13	14	3D3V_S0
GND	15	16	GND
5V_S0	17	18	5V_S0

4.2 Battery Flexspace Dimensions

Figure 4 shows the horizontal dimensions of the flexspace within the interior of the base half of the X7 battery adapter shell. Figure 5 shows the vertical dimensions. A custom card or module would need to use the three available M2.5 x 3.8 mm mounting inserts. Depending on the size and shape of the module, standoffs may be required.


MOUNTING INSERTS

130

35
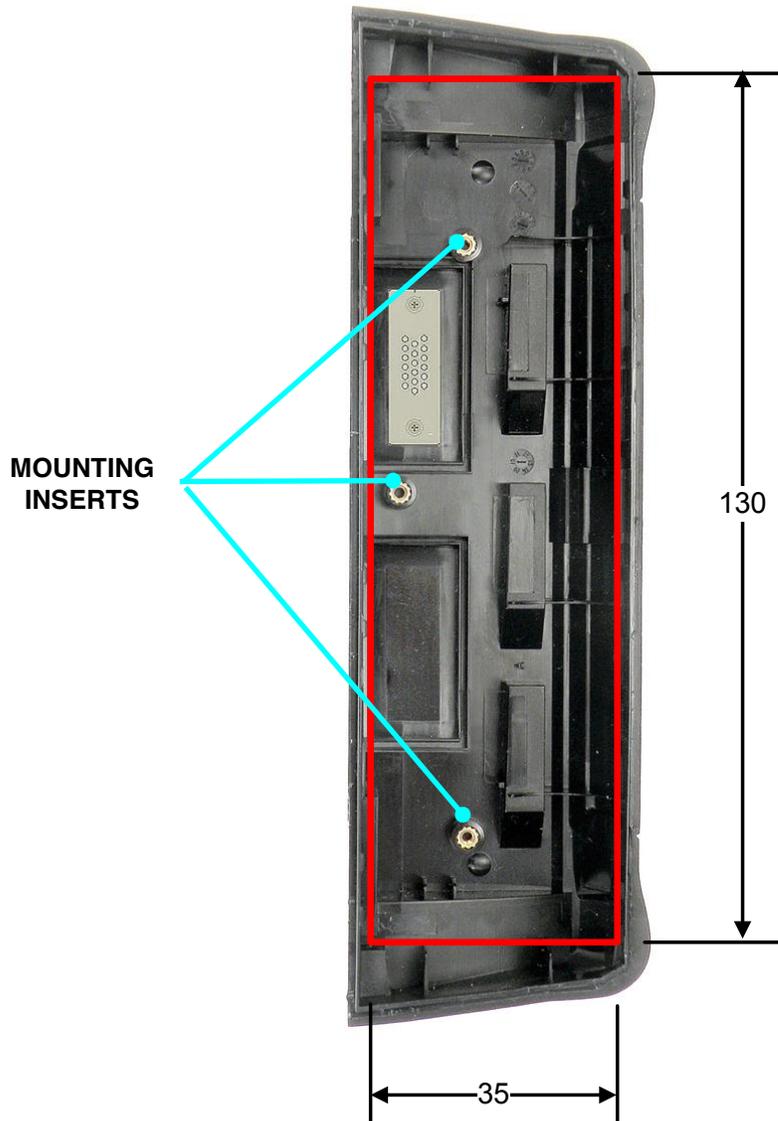
Figure 4. Battery Adapter Flexspace Horizontal Dimensions

NOTE: All dimensions are in mm
All measurements are approximate

DRS Tactical Systems, Inc.
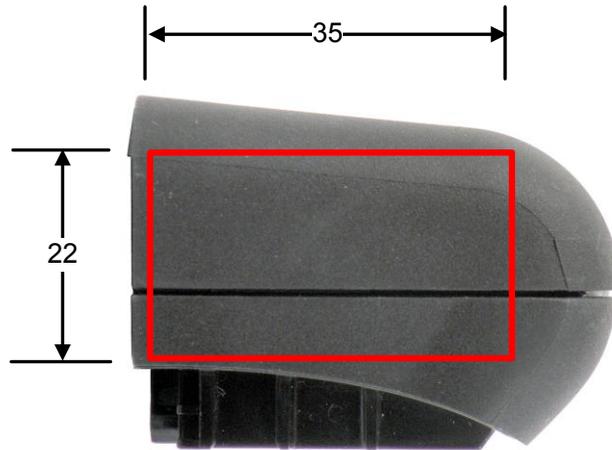
Figure 5. Battery Adapter Flexspace Vertical Dimensions

4.3 Certifications

Any custom card or module must comply with the environmental, physical and regulatory requirements imposed on the X7 tablet computer.

4.3.1 Environmental Requirements

4.3.1.1 Thermal

The Armor X7 tablet is rated to operate from -20 to + 60° C in accordance with MIL-STD-810F, Method 501.4 and MIL-STD-810F, Method 502.4. With an estimated internal temperature rise of up to 15°C, an internal flexspace module must support operation to +75°C. There is no forced air or other cooling available for the internal flexspace.   Use of components that are rated for industrial temperature ranges is encouraged.

Storage temperature requirements for the X7 are from -40 to + 70° C in accordance with MIL-STD-810F, Method 501.4 and MIL-STD-810F, Method 502.4.

4.3.1.2 Physical Requirements

The Armor X7 tablet must operate through the vibration profile of MIL-STD-810F, Method 514.5, Figure 514.5C-3 Composite Wheeled Vehicle Exposure.

It must meet storage requirements IAW MIL-STD-810F, Method 514.5, Figure 514.5C-17 Minimum Integrity Exposure, plus MIL-STD-810F, Method 514.5, Figure 514.5C-2 Composite Two-Wheeled Trailer Exposure.

DRS Tactical Systems has years of expertise in electronics ruggedization to assist you in this area.

4.3.1.3 Regulatory Requirements

4.3.1.3.1 EMI/EMC

Depending on the nature of the Flexspace module the X7 tablet may be required to be re-certified to pass standard EMI/EMC certification to CE and FCC limits and EU emissions and immunity testing to assure compliance with EU directives for CE marking.

4.3.1.3.2 Radiated Emissions (RE102) and Susceptibility (RS103

The X7 is tested for emissions in accordance with MIL-STD-461E, RE102 for fixed wing internal applications, <25 meters aircraft length and for susceptibility in accordance with MIL-STD-461E, RS103, 100V/meter, 2 MHz to 10GHz.

4.3.1.3.3 Safety/SAR

Depending on the nature of the Flexspace module, the X7 tablet may be required to be re-approved for U.S and EU safety certifications (UL and CE marking – EN60950).

Likewise the U.S and EU Specific Absorption Rate (SAR) levels (defined in OET Bulletin 65, Supplement C and EN 50392 respectively), may have to be re-tested based on the nature of the Flexspace module.

4.3.1.3.4 RoHS

The X7 tablet is RoHS compliant, and any Flexspace module must also meet this requirement in order to maintain compliance. Component documentation and testing are required to assure compliance.

RECORD OF CHANGES

Rev	ECO #	Description Of Change
-	84226	Initial Release.