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Who Navigates Iskander?

**The American Microelectronics
Inside Russia's Ballistic Missile**



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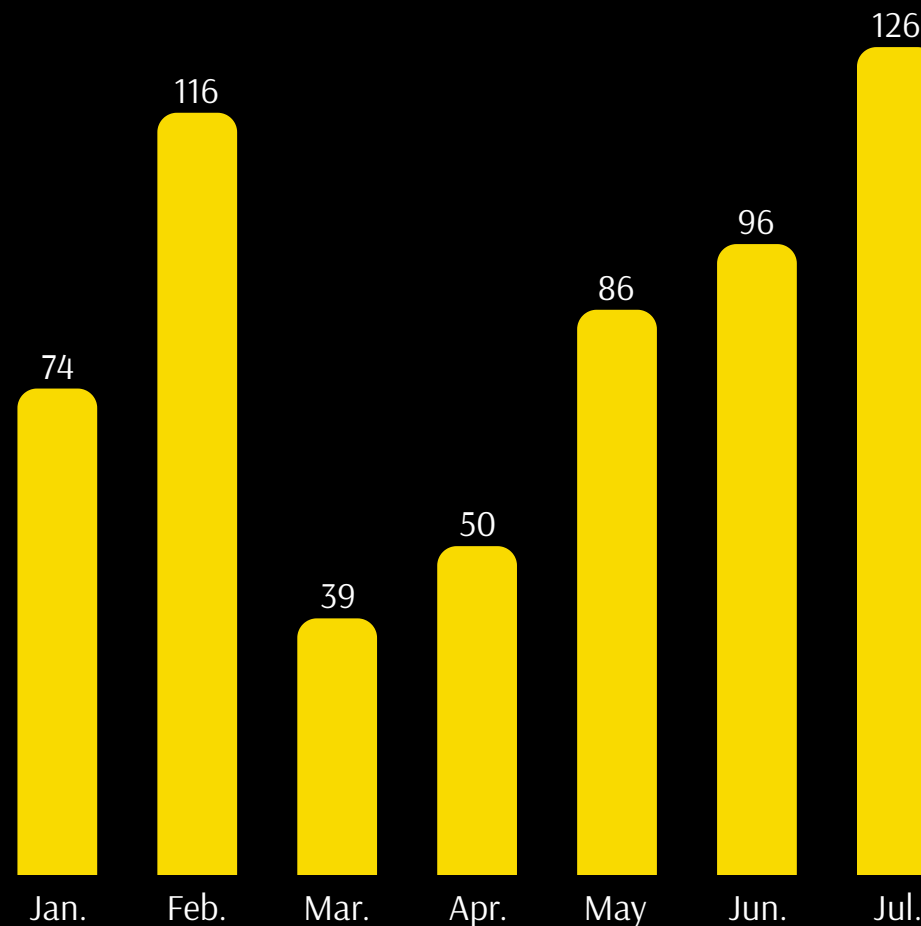
INTRODUCTION

Russia has significantly intensified its use of ballistic missiles in 2026, at a time when Ukraine faces shortages of interceptors such as U.S.-made Patriot missiles. According to monitoring data, **since the beginning of 2026, Russia has launched more than 500 ballistic missiles.**

Ukraine's Defense Intelligence (DIU) estimates that **Russia can produce more than 200 cruise and ballistic missiles per month** with Iskander-M, Kh-101, and Kalibr missiles among the main production priorities. In particular, the estimated stockpile included approximately **130 Iskander-M missiles.**

Its ballistic arsenal is also being reinforced through **increasingly close military cooperation with Pyongyang:** a renewed use of North Korean KN-23 missiles has been documented starting at the end of July, while in August, Moscow has reportedly begun deploying a North Korean missile unit with six launchers and 120 ballistic missiles. Together, domestic production and North Korean supplies could allow Russia to maintain high rates of ballistic missile use even as existing stockpiles are depleted.

2026 Monthly Ballistic Missile Counts (Iskander-M, KN-23, and S-300/S-400*)



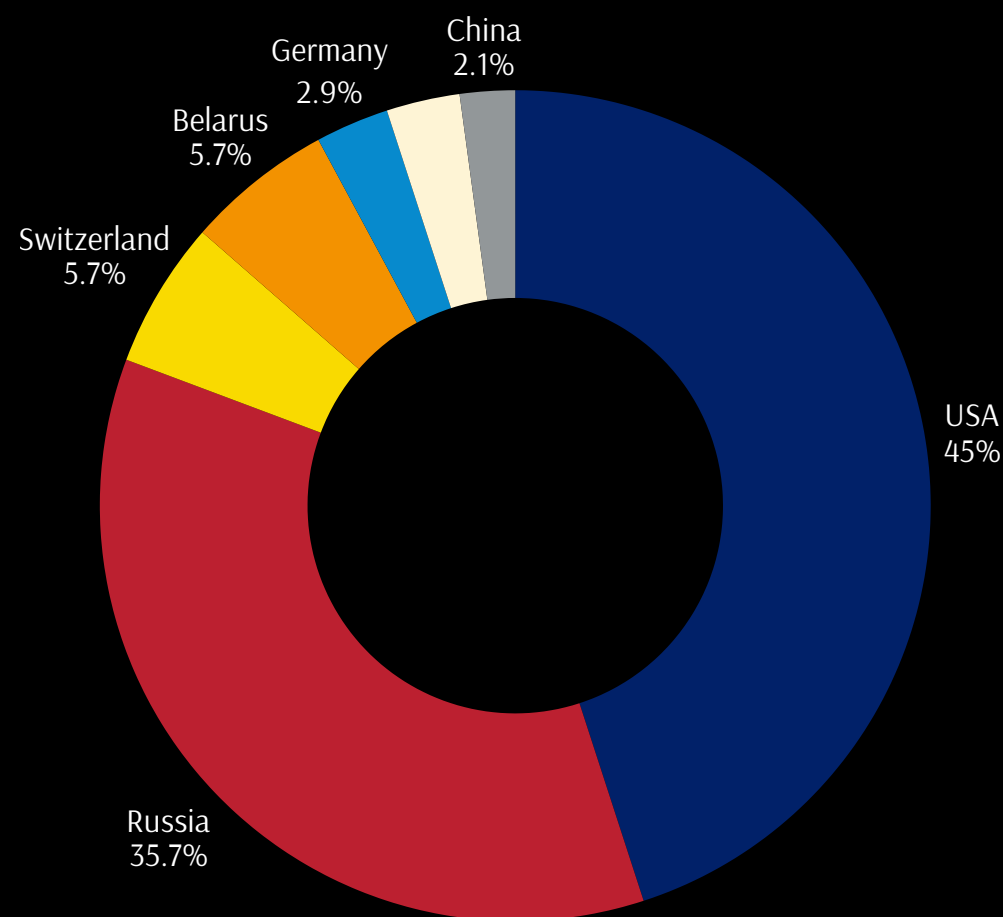
INTRODUCTION

Compared with loitering munitions, where the share of Chinese microelectronics has gradually increased and is now roughly on par with that of U.S.-made components, the Iskander-M presents a markedly different picture. According to the latest data published by DIU, only around **a quarter of the 140 identified Russian companies manufactured Iskander-M components**. Nearly half were produced **by U.S. manufacturers**, with components sourced from Switzerland, Belarus, Germany, Taiwan, and China.

The broader trend, however, points toward the growing localization of Russia's missile component base. Our previous analysis of the Oreshnik missile found its production ecosystem to be overwhelmingly concentrated around Russian and Belarusian manufacturers. The Iskander-M, however, remains notably different: despite continued localization efforts, **foreign manufacturers still dominate its identified component base**.

This dependence becomes even more pronounced when looking specifically **at the missile's navigation system**.

Country of Origin of Iskander-M Components
*identified by Ukraine's Defence Intelligence**



9K720 Iskander

Several Russian missile systems carry the Iskander name but employ fundamentally different types of missiles.

Iskander-M is the ballistic variant, primarily associated with the **9M723 family** of single-stage quasi-ballistic missiles.

Iskander-K, by contrast, is a cruise-missile variant. Its 9M727 missiles fly at very low altitude and use terrain masking to reduce the distance at which they can be detected by radar.

The family is also evolving. According to DIU, Russia used an upgraded 9M723-2, also referred to as “**Iskander-1000**,” against Kyiv for the first time during a combined missile strike in summer 2026. DIU identifies the missile as part of the new Bora-M system.

This analysis focuses specifically on the Iskander-M’s navigation system.



Iskander-M | 9M723

Unlike a conventional ballistic missile, the 9M723 remains guided throughout its flight and can maneuver along its trajectory.

It combines several guidance and navigation methods. During its flight, the missile primarily relies on an **inertial navigation system (INS)**, which can be supplemented by satellite navigation. In the terminal phase, an **optical correlation seeker** can be used to guide the missile toward its target.

The optical system captures an image of the target area and compares it with a reference image uploaded to the missile before launch. Because this method does not depend on external radio-navigation signals, it can continue operating when satellite navigation is unavailable or affected by electronic warfare.

Together, inertial navigation, satellite correction and terminal optical guidance help the 9M723 maintain accuracy across different conditions. **This architecture relies on several electronic systems rather than a single navigation unit.**

MAIN CHARACTERISTICS

Type Short-range ballistic missile	Warhead Conventional and nuclear-capable payloads
Range 390 km	Weight 3,800 kg, including a 480 kg warhead
Speed 2,100 m/s	Length 7,2 m



Inside the Inertial Navigation System (INS)

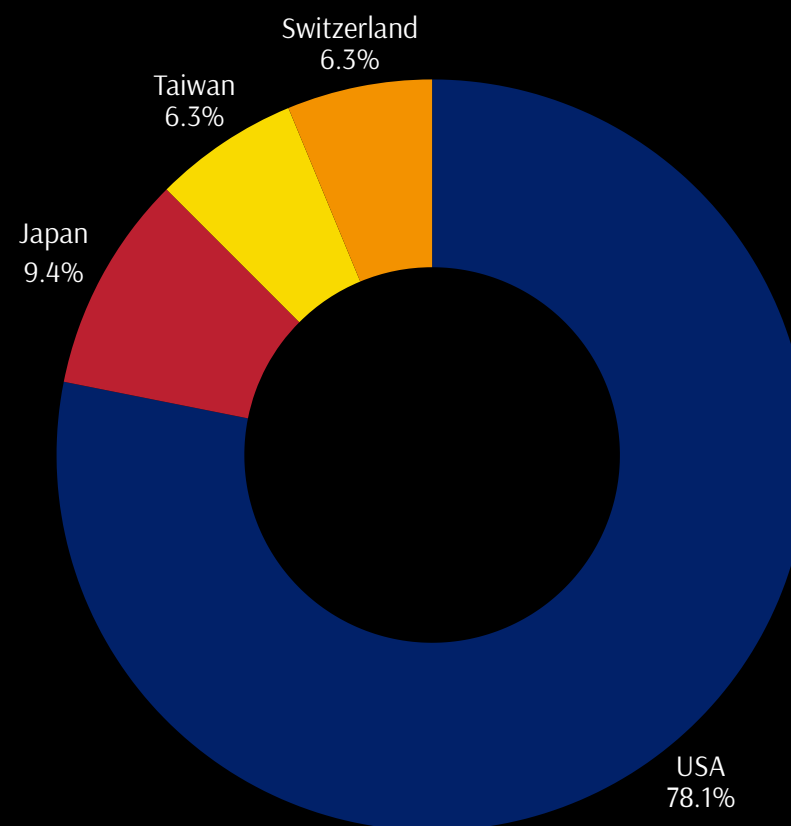
Iskander-M's INS relies overwhelmingly on U.S. components.

The United States alone accounts for 13 microelectronics manufacturers identified. Combined with the country-level breakdown, this suggests that the system's dependence is not limited to a single U.S. manufacturer or component category.

The remaining components are scattered among a much smaller group of manufacturers. **Three Japanese companies** were identified: Murata, supplying a broadband EMI suppression filter of a type previously encountered in our component analyses; Panasonic's relay, and Toshiba, represented by a component that could not be identified more precisely.

Components of Swiss and Taiwanese origin are also present. TRACO Power DC/DC converters represent Switzerland, while the Taiwanese component base includes products from two manufacturers: a Vortex86DX-based x86-compatible system-on-chip from DM&P Electronics and flash memory manufactured by Winbond.

Country of Origin of Iskander-M's INS Components*



Analog Devices Dominate in Iskander-M

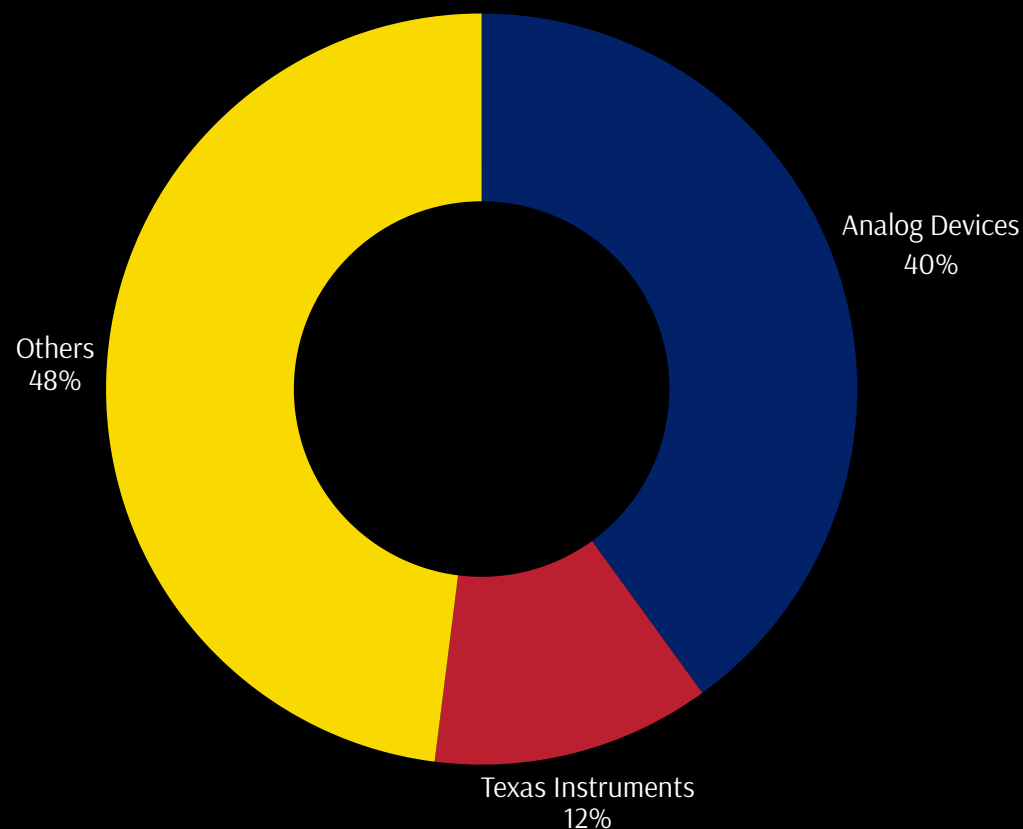
Analog Devices is the largest U.S. manufacturer represented in the Iskander-M INS dataset, accounting for 40% of all identified U.S.-origin components.

Texas Instruments accounts for a further 12%, while the remaining 48% is distributed among 11 other U.S. manufacturers:



Nearly four out of five components identified in the INS are of U.S. origin, with more than half of those supplied by **just two U.S. manufacturers.**

U.S-origin Companies in Iskander-M's INS Components*

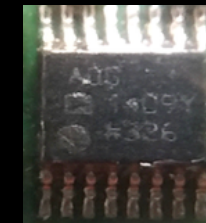


Analog Devices: Components for Precision Signal Processing

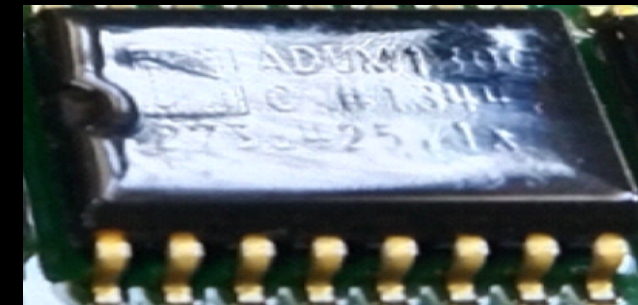
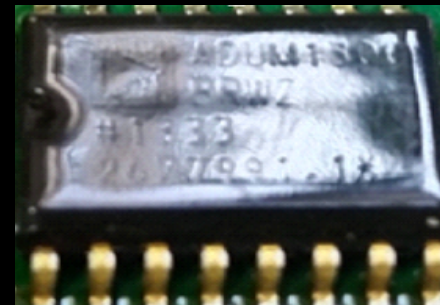
Several Analog Devices components identified in the system form a coherent precision signal-processing chain covering analog signal selection and conditioning, high-resolution conversion, voltage referencing, temperature monitoring, and digital isolation.

Four-channel differential analog multiplexers used to select and route analog signals between multiple inputs and a common output. Such devices are commonly used in data-acquisition and instrumentation circuits where multiple analog signals must be sequentially processed by shared downstream electronics.

Triple-channel digital isolators are based on Analog Devices' iCoupler technology. They provide galvanic isolation between digital circuits while allowing data transmission across the isolation barrier, with applications including data-converter isolation.



ADG509F, ADG409 and ADG1409 – differential analog multiplexers used for analog signal selection and routing.



ADuM1300 – digital isolators providing galvanic isolation between digital circuits.

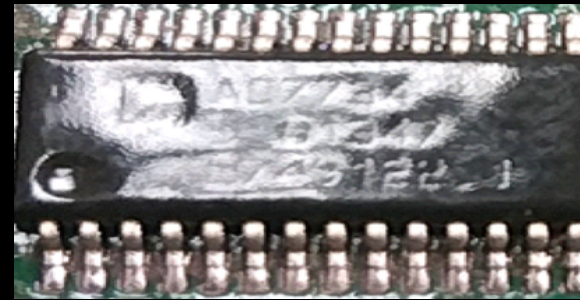
Analog Devices: Components for Precision Signal Processing

A **four-channel, high-throughput 24-bit sigma-delta analog-to-digital converter** converts analog input signals into digital data for subsequent processing and is specifically designed for high-resolution multiplexed data-acquisition applications.

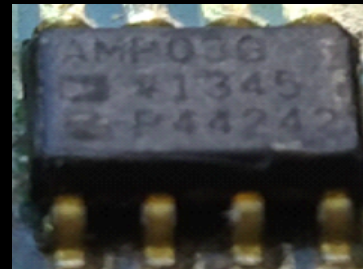
A **high-speed precision differential amplifier** provides precision amplification and conditioning of differential analog signals, while a precision 10 V **voltage reference** supplies a stable reference for measurement and data-conversion circuitry.

A **high-accuracy 16-bit digital temperature sensor** provides dedicated temperature monitoring via an SPI interface.

Altogether, the range of identified components highlights Analog Devices' central role in the INS's precision measurement and data-acquisition circuitry.



AD7734 – four-channel, 24-bit sigma-delta analog-to-digital converter for high-resolution data acquisition.



AMP03 precision differential amplifier, ADR01 precision 10 V voltage reference, and ADT7310 high-accuracy digital temperature sensor.

Texas Instruments: Identifying Previously Unidentified Logic Components

A Texas Instruments component marked **1BAYSKK** appears once in the examined Iskander-M INS. Its functionality was not identified in the original component analysis. A component bearing the same markings has previously been documented by DIU in the Kh-47M2 Kinzhal and appears in the War & Sanctions database under the same designation.

Our additional identification and verification indicate that 1BAYSKK is not the component's part marking, but a Texas Instruments **manufacturing traceability code**. The second line visible on the examined components (65C23243) corresponds directly to the official top-side marking of the Texas Instruments SN65C23243, a multichannel RS-232 line driver/receiver. TI documentation provides direct confirmation of this identification.

Accordingly, the components previously catalogued as unidentified "1BAYSKK" can be reclassified as Texas Instruments SN65C23243, used to provide serial communication interfaces between electronic subsystems.



Left – Iskander-M component documented by NAKO;
right – Kh-47M2 Kinzhal component from the War & Sanctions database.

ORDERING INFORMATION				
T _A	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
–0°C to 70°C	SSOP (DL)	Tube of 25	SN75C23243DL	75C23243
		Reel of 1000	SN75C23243DLR	
	TSSOP (DGG)	Reel of 2000	SN75C23243DGGR	75C23243
–40°C to 85°C	SSOP (DL)	Tube of 25	SN65C23243DL	65C23243
		Reel of 1000	SN65C23243DLR	
	TSSOP (DGG)	Reel of 2000	SN65C23243DGGR	65C23243

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

The TI datasheet explicitly identifies 65C23243 as the top-side marking for SN65C23243 devices – the same marking visible on both examined components.

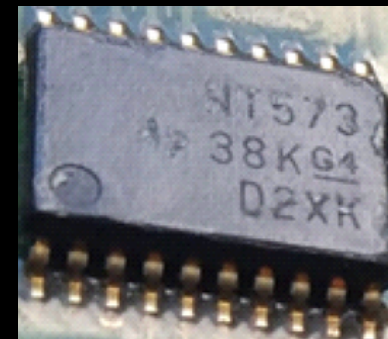
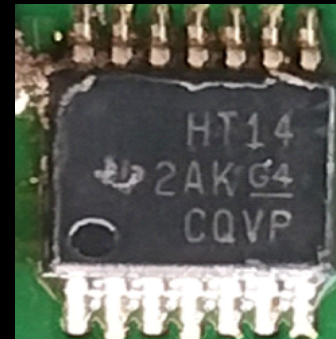
Texas Instruments: Identifying Previously Unidentified Logic Components

Two additional Texas Instruments components whose functionality was not identified in the original analysis can be identified through their abbreviated top-side markings.

TI documentation identifies **HT14** as the part marking used for several package variants of the SN74HCT14, a **six-channel Schmitt-trigger inverter**. The device converts input signals into clean digital logic outputs and is particularly useful for handling slow or noisy signal transitions.

Similarly, **HT573** is the documented part marking for several variants of the SN74HCT573, an **eight-bit transparent D-type latch** with three-state outputs. It provides temporary storage and controlled transfer of digital data and can interface with shared data buses.

In both cases, the apparent component identifiers recorded in the original analysis are therefore package markings rather than full part numbers.



HT14 and HT573 markings on components recovered from the Iskander-M INS, identified as SN74HCT14 and SN74HCT573, respectively.

PACKAGING INFORMATION									
Orderable part number	Status (1)	Material type (2)	Package Pins	Package qty Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
SN74HCT573DBR	Active	Production	SSOP (DB) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HT573
SN74HCT573DBR.A	Active	Production	SSOP (DB) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HT573
SN74HCT573DBRG4	Active	Production	SSOP (DB) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HT573
SN74HCT573DW	Obsolete	Production	SOIC (DW) 20	-	-	Call TI	Call TI	-40 to 85	HCT573
SN74HCT573DWR	Active	Production	SOIC (DW) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HCT573
SN74HCT573DWR.A	Active	Production	SOIC (DW) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HCT573
SN74HCT573DWRG4	Active	Production	SOIC (DW) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HCT573
SN74HCT573N	Active	Production	PDIP (N) 20	20 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	SN74HCT573N
SN74HCT573N.A	Active	Production	PDIP (N) 20	20 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	SN74HCT573N
SN74HCT573NSR	Active	Production	SOP (NS) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HCT573
SN74HCT573NSR.A	Active	Production	SOP (NS) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HCT573
SN74HCT573PW	Obsolete	Production	TSSOP (PW) 20	-	-	Call TI	Call TI	-40 to 85	HT573
SN74HCT573PWR	Active	Production	TSSOP (PW) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HT573
SN74HCT573PWR.A	Active	Production	TSSOP (PW) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HT573

TI packaging documentation lists HT573 as the official part marking for multiple SN74HCT573 package variants.

A Diverse Set of Critical Functions: Other U.S. Manufacturers

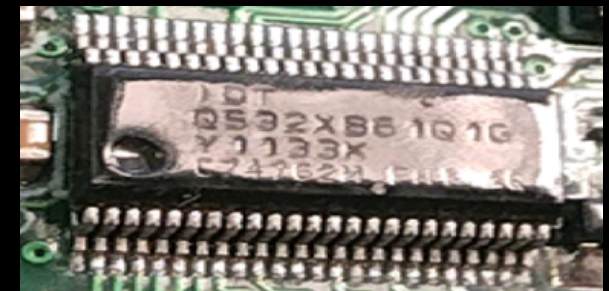
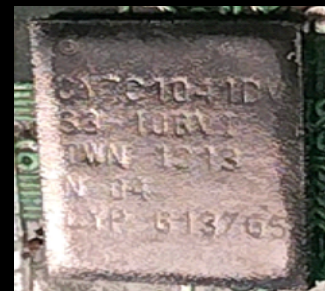
Components from other U.S. manufacturers span a broad range of functions within the INS. Power and precision analog circuitry includes a low-noise 1.5 A linear regulator, a high-speed programmable-gain instrumentation amplifier, and precision voltage references.

A substantial group is associated with programmable and digital logic, including a **Xilinx** XC2S50 – Spartan-II field-programmable gate array (FPGA), providing reconfigurable digital logic for implementing application-specific functions, a complex programmable logic device (CPLD), and a high-speed 20-bit CMOS bus switch. A 4-Mbit asynchronous parallel SRAM provides high-speed data storage, while a low-power dual transceiver supports digital communications.

Together, these components show that U.S.-origin microelectronics extend across multiple functional layers of the INS – from power regulation and precision signal handling to memory, communications, and programmable logic.



Xilinx Spartan-II FPGA and Actel ProASIC Plus FPGA – programmable logic devices enabling application-specific digital functions.



Cypress Semiconductor 4-Mbit asynchronous SRAM and IDT high-speed 20-bit CMOS bus switch.

CONCLUSION

Russia has built resilience through localization – but that resilience is uneven. The Iskander-M INS remains a clear point of dependence on Western, predominantly U.S., microelectronics.

Moscow has demonstrated a significant capacity to localize the electronic component base of its missile systems. Previously examined electronics recovered from the Oreshnik missile were produced by Russian and Belarusian manufacturers, while DIU's broader mapping of the Iskander-M also shows **a substantial domestic component base alongside foreign electronics**. This suggests that Russia has developed a degree of resilience against export restrictions by substituting domestically or regionally produced components where its industrial base allows.

The Iskander-M navigation system, however, reveals a markedly different picture. In the examined INS, the identified microelectronics are entirely foreign-made, with U.S.-origin components accounting for 78.1%. These are not confined to a single peripheral function: U.S. components perform critical functions in signal processing, data conversion, programmable logic, memory, communications, and power management.

The contrast points to an uneven technological resilience. Russia appears increasingly capable of replacing foreign electronics in parts of its missile architecture, particularly where low- and medium-complexity domestic components are sufficient. Yet the navigation system examined here continues to depend heavily on foreign—and predominantly U.S.—microelectronics for a wide range of functions.

Localization of the broader missile component base does not necessarily mean technological independence in every critical subsystem. Instead, the evidence suggests that Russia's remaining dependencies are becoming more concentrated in specific technological areas where Western microelectronics continue to provide capabilities that domestic substitution has not fully displaced.

Against the backdrop of growing ballistic missile production and use, the Iskander-M INS represents a particularly important target for export-control efforts. Its continued dependence on foreign microelectronics provides a potential point of leverage within an otherwise increasingly resilient and localized missile production ecosystem.



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