



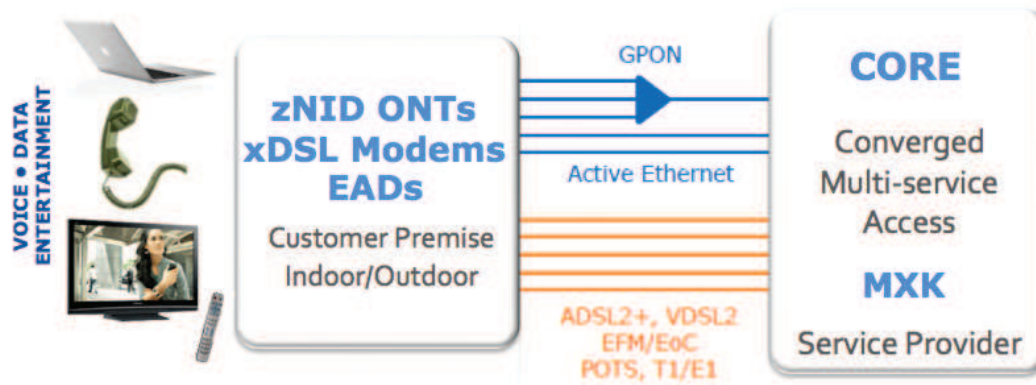
DASAN Zhone Solutions



FTTX PRODUCT BROCHURE

Bandwidth Changes Everything

Multi-Service Access



Providing the most complete solutions with advanced flexibility and clean migration from copper to fiber

More than just a corporate tagline, “Bandwidth Changes Everything™” articulates DasanZhone’s corporate vision and product philosophy. It exemplifies DasanZhone’s investment in market-leading high-bandwidth solutions that help service providers monetize the burgeoning FTTx, Mobile Backhaul and Multi-Service access market opportunities and solves their last-mile and bandwidth bottleneck.

Today, we are witnessing continued momentum towards high-bandwidth connectivity over fixed broadband and wireless networks. Fixed networks are increasingly moving towards Ethernet and fiber last mile connectivity. Smart phones and tablets are powering users with anytime, anywhere access to information, communication and entertainment.

Fixed-line operators have placed a universal focus on enabling technologies like Gigabit Passive Optical Network (GPON), Active Ethernet (AE) and Very High Speed Digital Subscriber Line 2 (VDSL2) as they strive to achieve Fiber-to-the-Home (FTTH), Fiber-to-the-Node (FTTN), Fiber-to-the-Curb (FTTC) and Fiber-to-the-Building (FTTB) connectivity. At the same time, there’s an emerging emphasis on mobile backhaul by wireless operators as they develop and design the most advanced and converged networks for the future.

DasanZhone has long been a pioneer in the telecommunications industry with its broadband and multi-service access solution offerings. We are at the forefront of technology innovation today, with large-scale global deployments of our high-capacity multi-service solutions designed to provide cost effective enhanced performance solutions for each operator’s unique bandwidth requirements.

Building Blocks to Delivering Triple Play Services

At the core of any solution for residential or business service is the broadband access network. DasanZhone products deliver a diverse range of fiber and copper capabilities in a single converged solution. The MXK Multi-Service Terabit Access solution helps set the foundation for enhanced service delivery by providing the optimal solution from the edge to the core of an operator's network.

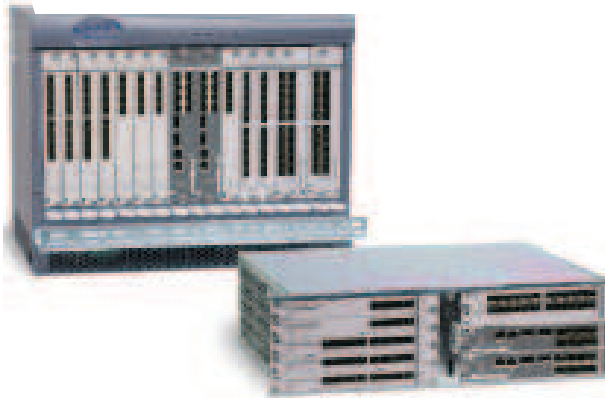
To begin with, an operator can seamlessly provision **high-speed data** over any access medium, including wireless, copper or fiber, while delivering high-performance all-IP access designed specifically for today's traffic. The MXK, in combination with zNID ONTs, provide solutions for the core and edge points of the network while providing high-speed data solutions for FTTx deployments. Ultimately, **MXK is the cornerstone for FTTx**, a singular platform supporting FTTH, FTTN, FTTC and FTTB solutions.

When it comes to **voice transmission and interoperability**, the operator can subsequently overlay IP voice service. DasanZhone's MXK will interoperate with any softswitch that the operator chooses to provide converged voice and data service, over any access medium. Services like Class 5 Local, Class 4 Long Distance, PSTN Emulation, NGN and VoBB can all be enabled seamlessly over the same network.

Multimedia, entertainment and IPTV has evolved to be some of the more exciting and challenging services to deploy. DasanZhone enables operators to effectively build the foundation for their next-generation interactive communication networks. An operator can effectively overlay IPTV and Entertainment service to provide a converged voice, data and entertainment service over any access medium. DasanZhone's products and solutions have been tested for interoperability with a diverse range of video systems from some of the leading IPTV solution vendors.



Optical Line Terminal (OLT)



As service providers have moved rather rapidly from copper to fiber in their networks, Passive Optical Network (PON) has become a widely deployed technology utilizing point-to-multipoint fiber architecture. In a typical PON network, OLTs are deployed at the Central Office (CO) site and ONTs are deployed closer to the subscribers. Gigabit PON (GPON), based on ITU-T G.984 standards has become the leading and defacto PON standard providing 2.5 Gbps downstream and 1.25 Gbps upstream bandwidth capability on each deployed fiber. GPON also provides the ability to split the fiber connectivity up to 128x, with 32x and 64x being the norm. The ability to split fiber enables service providers to reach multiple homes and businesses thereby making the service more cost effective and customized for the subscriber needs.

Active Ethernet, another broadband access technology that competes with PON, is also supported on the same OLT by DasanZhone. Active Ethernet, introduced in 2004 as part of the IEEE 802.3ah standard, utilizes point-to-point fiber architecture and active components to provide a full symmetrical 100 Mbps or 1 Gbps connectivity per subscriber.



MXK OLT

DasanZhone's MXK is a fully redundant, carrier-grade All IP platform and the industry's 1st terabit access concentrator. As an OLT, the MXK offers a wide range of options for FTTx solutions. It supports Active Ethernet and GPON line cards, and interoperates with indoor and outdoor ONTs. Supporting Active Ethernet and GPON on the same chassis allows service providers to configure their networks with maximum flexibility and efficiency, using a combination of GPON splitters and dedicated fiber connections.

DasanZhone's MXK features industry-leading density, scalability and switching capacity. The MXK provides non-blocking capacity of up to 3,600 100 Mbps GPON subscribers or 360 1G Active Ethernet subscribers.



MXK-F OLT

The DASANZhone's MXK-F™ chassis architecture is designed around a dual star design with redundant ultra high-speed links to each subscriber line card slot for future-proof support of today's and tomorrow's bandwidth-hungry fiber-based subscriber services. Also MXK-F™ management control and aggregation switch fabric functions reside on two separate cards, each of which can be equipped in a redundant configuration; MCs (Management Cards) and FC (Fabric Cards). Lastly, a fully-distributed database and parallel firmware loading enable simple fast upgrades.

DasanZhone's MXK-F™ is well-suited as high-density fiber-based service platform to cost-effectively deliver ITU-T G.984 GPON, IEEE 802.3-2008 1 and 10Gb/s Active Ethernet, ITU-T G.987 XGPON1, ITU-T G.989 NGPON2, and other advanced fiber-based services for residential triple play and high-bandwidth business services over any FTTx architecture.



The MXK-F™ platform supports a 16-port GPON OLT access service card providing standards-based support of 2.5Gbps downstream and 1.25 Gbps upstream bandwidth. The largest MXK-F1421 chassis supports up to 256 OLT ports, and with 128-splits and the use of Class C+ optics, the platform can support up to 32,768 ONTs.

A favorite in enterprise, hospitality, and academic applications, MXK-F219 contains 2-access multi-service subscriber slots, 2-network facing slots. MXK-219, like all members of the MXK-F™ family, provides plenty of future-proof capability for 1G to 40G Active Ethernet, as well as GPON, XGPON1, XGSPON, and NG-PON2 service requirements, and future undefined services.

MXK Family

DasanZhone's **MXK™** and **MXK-F™** are a fully redundant, carrier-grade all-IP platform enabling multi-service terabit access solutions from the edge to the core of a service provider's network, with seamless and integrated support for multiple technologies including GPON, Active Ethernet. The system is designed for high scalability, flexibility, and performance.

Operators are utilizing DasanZhone products and solutions to provision their residential and business services globally. DasanZhone customers deploying the MXK Terabit Access solution are convinced that they are protected for the future as the MXK solution has been designed to support the exponentially growing levels of personalized unicast traffic in the service provider's network. With fully redundant, dual-star 200 Gbps connections to every slot in the chassis, DasanZhone's MXK provides unmatched non-blocking bandwidth for the burgeoning social media interactivity.

	MXK-F 1419	MXK 823/819	MXK 319	MXK-F 219	MXK 194/198
Physical					
Configuration	Chassis	Chassis	Chassis	Chassis	Fixed 1U
Size	14U x 19"	8U x 19 or 23" rack	3U x 19" rack	2U x 19"	1U x 19"
Power	-48V DC	-48V DC	-48V DC	-48V DC	-48V DC
Uplink Slots	2	2	2	2	N/A
Line Card Slots	14	18/14	7	2	N/A
Ambient Temperature	-40C to +65C	-40C to +65C	-40C to +65C	-40C to +65C	-40C to +65C
Card Replace	Hot Swap	Hot Swap	Hot Swap	Hot Swap	N/A
Uplinks					
40 Gig.E	•				
10 Gig.E	•	•	•	•	•
Gig.E	•	•	•	•	•
EAPS	•	•	•	•	•
LAGG / LACP	•	•	•	•	•
MSTP	•	•	•	•	•
Management					
DZMS/CLI	•	•	•	•	•
Web GUI	•	•	•	•	•
Unified Provisioning	•	•	•	•	•
Access/Line Cards (subs)	MXK-F 1419	MXK 823/819	MXK 319	MXK-F 219	MXK 194/198
GPON-4**		256-4608/3584	256-1792		256
GPON-8**		512-9216/7168	512-3584		512
GPON-16*	2048-28672			2084-4096	
Active Ethernet	32-448	20-360/280	20-140	32-64	N/A
* Assumes 128-split **Assumes 64-splitss					



Optical Network Terminal (ONT)

To achieve optimum cost efficiency and to maximize service differentiation, service providers building FTTx networks demand ONTs well tuned to their specific requirements. In response to the broad scope of these requirements, DasanZhone has leveraged deep experience in managing the complexity of multi-service access to build the industry's most comprehensive portfolio of FTTx ONTs, for both Active Ethernet and GPON standards.

These models include a variety of configurations for residential, business, MDU, and cellular backhaul applications. Every model in the portfolio is tightly integrated into the DasanZhone Management System, supported by new features such as auto-provisioning and any service-any port configuration that substantially reduce the costs of FTTx network deployment and maintenance.



GPON Indoor

Designed for use within the premise, DasanZhone's indoor GPON ONT family has many options for deployment of FTTx services. Models range from a single Ethernet port to a model with 24 voice ports and 24 Ethernet ports allowing the service provider to choose the right model for the job. The indoor GPON portfolio also includes models with T1/E1 interface for transport over a packet network.

Model	WAN	POTS	T1 / E1	FE	GE	GE-PoE	RF VIDEO	WiFi (b/g/n)	WiFi (ac)	USB	IN-WALL
2101P	GPON					1					
2301	GPON				1						
2402A	GPON				2						
2403A	GPON				2		YES				
H660G	GPON	2			4						
H660W	GPON	2			4			2x2			
H660WD	GPON	2			4		YES	2x2			
2424A	GPON	2			4						
2425A	GPON	2			4		YES				
2426A	GPON	2			4			2x2		YES	
2427A	GPON	2			4		YES	2x2		YES	
2424A1	GPON	2			4					YES	
2426A1	GPON	2			4			2x2		YES	
2428A1	GPON	2			4			2x2	3x3	YES	
2608T	GPON					8					
2624A	GPON	2			4						
2624P	GPON	2				4					
2628A	GPON	2			8						
2628P	GPON	2			4	4					
2628T	GPON	2				8					
2644A	GPON	4			4						
2644P	GPON	4				4					
2648A	GPON	4			8						
2648P	GPON	4			4	4					
2648T	GPON	4				8					
2726A1	GPON	2			4			2x2	3x3	YES	
2727A1	GPON	2			4		YES	2x2	3x3	YES	
2728A1	GPON	2			4			3x3	4x4	YES	
28XD	GPON					4					YES
2804P	GPON					4					YES
2813P	GPON	1				2	YES				YES
2814P	GPON	1				2		2x2			YES
2815P	GPON	1				2	YES	2x2			YES
6024T	GPON/GE					24					
95XX	GPON/GE		4,8		9						
96XX	GPON/GE	4,8	4,8			9					
97XX	GPON/GE		4		5						



Active Ethernet Indoor

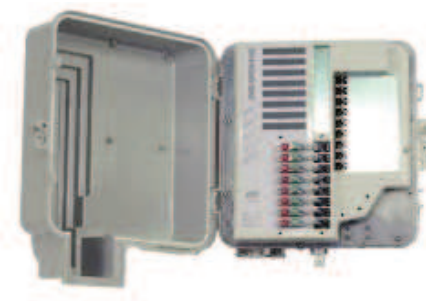
DasanZhone's indoor Active Ethernet ONT portfolio is designed for the high bandwidth services being deployed to homes and businesses today. With wire-speed routing, a web UI for local management, and support for DasanZhone's CPE Management system, the DasanZhone Active Ethernet solution paired with the MXK OLT is an efficient way to extend bandwidth intensive services to the network edge.

Model	WAN	POTS	T1 / E1	FE	GE	GE-PoE	RF VIDEO	WiFi (b/g/n)	3G/4G	USB	IN-WALL
2402A	GE				2						
2424A	GE	2			4						
2424A	FE (Fiber)	2			4						
2424A	CU (GE Copper)	2			4						
2426A	GE	2			4			2x2		YES	
2426A	FE Fiber)	2			4			2x2		YES	
2426A	CU (GE Copper)	2			4			2x2		YES	
2424A1	GE	2			4					YES	
2426A1	GE	2			4			2x2		YES	
2428A1	GE	2			4				3x3	YES	
2608T	GE					8					
2624A	GE	2			4						
2624P	GE	2				4					
2628A	GE	2			8						
2628P	GE	2			4	4					
2628T	GE	2				8					
2644A	GE	4			4						
2644P	GE	4				4					
2648A	GE	4			8						
2648P	GE	4			4	4					
2648T	GE	4				8					
2726A1	GE	2			4			2x2	3x3	YES	
2727A1	GE	2			4		YES	2x2	3x3	YES	
2728A1	GE	2			4			3x3	4x4	YES	
2804P	GE					4					YES
6024T	GPON/GE					24					
95XX	GPON/GE		4,8		9						
96XX	GPON/GE	4,8	4,8			9					
97XX	GPON/GE		4		5						



GPON Outdoor

Based on a wire-speed router architecture, DasanZhone's outdoor GPON ONTs deliver best-in-class data throughput regardless of packet size to support the most demanding FTTx applications. Designed for outdoor deployments, all new models provide dual 1 Gigabit Ethernet LAN ports, two or four voice ports with support for SIP, SIP-PLAR and MGCP Voice over IP protocols. This gives service providers an elegant migration path from legacy to softswitch architectures without replacing ONTs. GPON models are available with and without support for downstream RF Video or RFoG.



Model	WAN	POTS	GE	RF Video	HCNA-C/P	MoCA	T1/E1	USB
4221	GPON	2	2	YES				YES
4222A	GPON	2	2					YES
4222H	GPON	2	2		C			YES
4223	GPON	2	2	YES	C			YES
4224	GPON	2	2		C,P			YES
4224A	GPON	2	4					YES
4224H	GPON	2	4		C			YES
4226	GPON	2	6					YES
4240	GPON	4	2					YES
4241	GPON	4	2	YES				YES
4242	GPON	4	2		C			YES
4243	GPON	4	2	YES	C			YES
4244	GPON	4	2		C,P			YES
9108	GPON	8	9					YES
9208	GPON	8	9			8		YES
9308	GPON	8	9	YES		8		YES
9440	GPON		5				4	YES
9444	GPON	4	5				4	YES
9480	GPON		9				8	YES
9488	GPON	8	9				8	YES

Active Ethernet Outdoor

Based on a wire-speed router architecture, DasanZhone's outdoor Active Ethernet ONTs deliver best-in-class data throughput regardless of packet size to support the most demanding FTTx applications. All new models provide dual 1Gigabit Ethernet LAN ports, two or four voice ports with support for SIP, SIP-PLAR and MGCP Voice over IP protocols. This gives service providers an elegant migration path from legacy to softswitch architectures without replacing ONTs. Active Ethernet models provide an SFP uplink that supports a wide variety of Active GigE transceivers for even greater deployment flexibility.

Model	WAN	POTS	GE	HCNA-C/P	MoCA	T1/E1	USB
4222A	GE	2	2				YES
4222H	GE	2	2	C			YES
4224	GE	2	2	C,P			YES
4224A	GE	2	4				YES
4224H	GE	2	4	C			YES
4226	GE	2	6				YES
4240	GE	4	2				YES
4242	GE	4	2	C			YES
4244	GE	4	2	C,P			YES
9108	GE	8	9				YES
9208	GE	8	9		8		YES
9440	GE		5			4	YES
9444	GE	4	5			4	YES
9480	GE		9			8	YES
9488	GE	8	9			8	YES

Unified Provisioning

Unified Provisioning is DasanZhone's end-to-end provisioning and management solution for subscriber services. It offers automatic discovery, software upgrade, and service provisioning when the customer premise equipment (CPE) is initially connected to the network. As Unified Provisioning evolves it will continue to provide more streamlined operations to help lower the service provider's costs associated with activating and managing subscriber services.

Unified Provisioning is an end-to-end solution with software components residing in the OA&M infrastructure of the DasanZhone devices, as well as on the DZMS platform. This architecture provides a highly scalable and extensible model for provisioning and managing subscriber services. This effectively enables service providers to remotely configure, provision and manage either a single device or multiple devices concurrently in a manual or automated fashion. Service providers benefit tremendously from a reduced Total Cost of Ownership (TCO) owing primarily to the recurring OPEX savings derived from auto-provisioning, remote configuration and a host of other features enabled by Unified Provisioning

Features like automatic control of software version on all deployed CPEs and ONTs, automatic configuration updates, elimination of the need to manage and provision CPEs and ONTs individually via WebUI or Telnet, extended visibility from DZMS to provision specific configuration parameters of the ONTs, elimination of truck rolls for troubleshooting, etc. are significant features that reduce recurring OPEX for the service provider.



Cabinets

Complementing DasanZhone's highly scaleable and full-featured access portfolio is one of the largest portfolios of outside plant cabinets from an access vendor. DasanZhone's OPX line of cabinets supports densities from 24 ports to 1800 ports all pre-configured and tested at DasanZhone facilities and ready to be installed on the concrete slab, pole or wall upon arrival at the service provider's location.



Large Cabinet Portfolio – OPX 4300 44UX/88UX Series

The OPX4300 44UX/88UX Outside Plant Exchange Cabinet Family was specifically designed to provide outdoor housing solutions for DasanZhone MSANs. This family of cabinets features Enhanced Cooling System with superior heat dissipation that can accommodate higher line density and traffic rate applications as well as significantly improving battery life. Utilizing heavy-duty aluminum construction, the cabinets provide corrosion, weather, fire, and vandal resistant protection and are designed to meet Telcordia GR-487 Issue 2 requirements.



The OPX4300 44UX/88UX family can accommodate from 200 lines up to 2000 lines, depending on the type of fiber or copper access equipment selected and installed. The OPX4300 44UX/88UX can be mounted on an existing host pad as an adjunct installation, utilizing an overhang plate. The Enhanced Cooling System enables a reduced cost-per-line solution and the capability for higher traffic rates and denser electronic equipment by greatly reducing battery temperatures without the use of air conditioners.

Small Cabinet Portfolio – OPX 4300 4U, 6U and 9U

DasanZhone's OPX4300 4U/6U/9U Outside Plant Exchange is a unique and cost-effective cabinet family that enables service to all subscribers by bringing the access closer to the end point. The OPX4300 provides up to 400 ports of copper and fiber ports. The OPX4300 cabinets can be mounted on a wall, or a pole next to existing cabinets. Service provider utilizes a single product whether deploying from the central office, existing remote cabinets, or extremely remote locations, making the operational and management of the network that much easier.



The OPX4300 cabinet allows for multiple powering options including DC Power (48 VDC), AC Power (90 / 240 VAC) and Line Power (1340 / 190 VDC), to allow for easy installation in all locations. The powering options along with the multiple fiber and copper access options ensure the availability of triple play services to any customer.

OPX - OSP 1U

DasanZhone's OPX-OSP 1U provides up to 48 ports of DSL and POTS. The OPX-OSP1U can be mounted on a wall, or a pole next to existing cabinets. Each OPX-OSP 1U cabinet is shipped pre-wired with 50-pair protection panels and can be used with DasanZhone's 1U DSLAM and MSAP products. This lets the service provider utilize a single product whether deploying from the central office, existing remote cabinets, or extremely remote locations, making the operational and management of the network that much easier.



DasanZhone Management System (DZMS)

DasanZhone's DZMS is a highly scalable platform that offers full configuration and management capabilities with an open northbound interface for automated service provisioning from the customer's OSS/BSS system. The platform can be configured for high availability with an additional remote server for disaster recovery. The DZMS application utilizes Oracle's WebLogic and Oracle database to provide state-of-the-art software infrastructure for advanced management capabilities.

DasanZhone's DZMS supports full Fault, Configuration, Accounting, Performance and Security (FCAPS) management. DZMS's FCAPS functionality enables quick turn-up of devices, advanced tools for increased productivity, real-time traffic and service monitoring and historical data collection for trending and analysis.

DZMS OSS Gateway provides an open standards-based Corba or XML interface for seamless integration into existing and new service provider Operations Support Systems (OSS). The interface provides for bi-directional transfer of management information for tasks such as automated flow through provisioning, inventory management, device configuration, capacity and status of various network entities.

We currently offer a new low-cost version of DZMS for small deployments. The new version DZMS VA-5000 is a virtual appliance that will run on x86 platforms with a Windows or Linux operating system. It will have full DZMS functionality but does not currently support OSS integration for automated service provisioning. DZMS VA-5000 is not only a good solution for small customers, moreover a great solution for larger customer that want to delay the purchase of a DZMS server until their networks expand. The customer can run DZMS VA-5000 on an existing PC.



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Sales Offices

Atlanta • Beijing • Bogotá • Cairo • Chicago • Dallas • Dubai • Hong Kong • London
Miami • Milan • Moscow • Oakland • San Juan, PR • São Paulo • Singapore • Stockholm
Tampa • Toronto

DasanZhone Global Customers Global Reference

DasanZhone has over 1,000 global customers today deploying world-class solutions for their service provider and enterprise networks. Zhone's customers attest to the high quality and performance of Zhone products, solutions and support. Our customers are closely involved with the product design and development process, ensuring that our products and solutions address the critical needs of their Service Provider and Enterprise networking requirements.



Zhone's incumbency with global service providers has been instrumental in helping Zhone achieve GPON Market Leadership in each of our served markets today. At the same time the depth and experience of our carrier class deployments has increased the performance, security and functionality of our Enterprise class Passive Optical LAN solutions.

Zhone has received numerous accolades from leading market research firms for its fiber optic based multi-service solutions deployed with our customers globally.

DasanZhone FTTX projects in Egypt

DasanZhone is the first supplier for FTTX solution in Egypt with a first deployment in 2007, with 10 years of field existence in the Egyptian DasanZhone has sold thousands ONTs for FTTH triple play services projects, multiple of running projects that depend on DasanZhone MXK to deliver high quality and grantee services performance for end users .



- Al Gouna (Multiple FTTH projects to deliver HSI, RF TV and Legacy/IP Telephony services for Al Gouna end clients, deployed since 2008)
- Palm Hills Development (Multiple FTTH projects to deliver triple play services in Palm Hills October, The Village, Hacienda Bay; deployed since 2010)
- SODIC (Algeria SODIC West)
- Orange Triple play services (Multiple of running projects)
- Multiple FTTX deployments with the Egyptian Army





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