Meridian 1 Option 61C

As part of the enabling infrastructure within Nortel Networks' high performance network, Meridian 1 systems deliver to your business modularity, flexibility and scalability. Meridian 1 employs a client-server based design that supports a range of users from 60 up to 16,000 cost-effectively and efficiently. Meridian 1 systems utilize state-of-the-art distributed digital switching and software stored program control. Meridian 1's distributed processing architecture (i.e., core, peripheral and applications processors) results in ultra-high reliability ("Five Nines") for today's mission critical voice applications. Meridian 1's adherence to open industry standards such as Simple Network Management Protocol (SNMP) for capturing Meridian 1 alarm traps, Lightweight Directory Application Protocol (LDAP) for simplified management and administration and H.323 for convergence of voice and data networks delivering Voice over IP (VoIP) , enables enterprise businesses both large and small to leverage investment in Meridian 1 while taking advantage of the latest and greatest technological offerings. Truly the best of both worlds!

Meridian 1 systems, from the Option 11C Mini, optimized for the small branch office, to Option 81C for large enterprises, utilize the same X11 software programming, thus providing common feature sets and reduced training costs as your business needs change. Meridian 1 systems support over 450 software features and services with X11 Release 25 software including an extensive array of call management features, support for ISDN Primary Rate and Basic Rate Networking, traditional voice messaging or new generation unified messaging features at the desktop and GUI based system administration. And newer technologies, such as VoIP, can be adopted cost-effectively and efficiently with Meridian 1, thus providing built-in "Evergreen" investment protection. They can be adopted at a pace that's right for that business. It's not a totally new solution to run converged voice with Meridian 1 systems. It's inherent within the architecture!

Meridian 1 Option 61C provides the ability to select a configuration within the 200 - 2,000 port range[1]. These ports can be flexibly configured, supporting traditional analog or digital desktop users as well as supporting next generation technologies such as the i2004 IP Telephone, i2050 Soft Phone, Unified Messaging platforms and Web Enabled Call Centers.

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[1] The figure of 2000 ports is based on nominal capacity and the actual capacity realized may, in some cases, exceed this figure or may fall below it. Determinants of actual capacity realized include software release utilized, site configuration and type of peripheral equipment. Contact your channel partner for further guidance on capacity engineering of Meridian 1 systems.

NORTEL NETWORKS

Meridian 1 Option 61C systems are divided into four functional areas. The four areas are:

- Power Equipment
- Common Equipment
- Network Equipment
- Peripheral Equipment

Power Equipment

Power Equipment provides the voltages required for the Meridian 1 system to operate. Option 61C systems **utilize** modular power distribution architecture. Power supplies are located in each module within a column stack, rather than in separate centralized power shelves. The power system provides for AC and DC power options (i.e., the choice of power option is primarily determined by reserve power requirements and existing power equipment at the customer site). Option 61C's power design also incorporates monitoring capabilities for the distributed power supplies via a quick connect wiring harness. Option 61C systems employ automatically adjusted forced-air impellers throughout the column stack for advanced cooling (i.e., each column stack can house a maximum of four tiers or modules). Option 61C also supports Uninterruptible Power Supplies (UPS) for reserve backup power in the event of brownouts or outages, if desired by the customer.

Common Equipment

Common Equipment is the control complex of the Meridian 1 system. The complex provides the sequences to process call connections, monitor call activity, and participate in performing system administration and maintenance. Common Equipment is made up of four elements:

- **Central Processing Unit (CPU**) – the CPU provides the computing power essential for system operation. Option 61C deploys a redundant CPU complex for ultra high reliability (i.e., "Five Nines") so in the unlikely event of a failure of one CPU; the network is supported from the redundant CPU in the complex. The redundant CPU operates in standby mode, able to support the entire network if error correction activities on the primary CPU are not successful in problem resolution. CPU's in the Meridian 1 portfolio are commercially based with the Option 61C supported on the top-of-the-line Motorola 68060E Call Processor (i.e., the "E" referring to Enhanced). The Motorola 68060E Call Processor provides 135,000 Busy Hour Call Completions (BHCC[2]).
- **System Memory** – stores all operating software programs and data unique to each Meridian 1 system. Memory modules for Option 61C systems are redundant and are commercially based. Memory includes Flash ROM (for short-term call statistics) and Single or Dual Inline Memory Modules (SIMM's **or** DIMM's) for customer program store. Memory for Option 61C systems is scalable and ranges from 64MB up to 160MB. The X11 software release, in addition to customer specific applications, determines the memory requirements for a particular system. Field upgrade kits provide for quick onsite installation of memory upgrades. Since Option 61C offers a redundant core complex for mission critical business requirements, the system design includes what is known as Changeover Memory Arbitration or "CMA". CMA results in each CPU card being connected to both memory modules. The active CPU writes status changes to both memories and each CPU can read from either memory. If one of the CPU's memory sets fails, the system immediately shifts to the surviving memory modules to retain customer data. The active CPU continues to support the network! This is another unique strength of the Meridian 1 design - which results in ultra high reliability.

[2] Busy Hour Call Completion (BHCC) is an often used industry metric to measure the call processor power of a CPU for a PBX. Traditionally, it is measured using analog sets in which the PBX performs constant redialing during a specified period of time for measurement. Meridian 1's distributed processing architecture allows the core complex CPU to perform the task it's best designed to do - that is to set up and tear down calls. Other processors in the network and peripheral modules support diagnostics and further switching.

- **Mass Storage Units**, which hold operating programs and data, are also redundant in Option 61C configurations. At system power up, program store and protected data store information are transferred from the Mass Storage Unit into the system memory of the Option 61C. As of X11 Release 24 and later, the media used for delivery on these systems is CD ROM based. The hardware is commonly referred to as IODU/C or Input Output Drive Unit-CD ROM and has shipped on new Option 61C systems as of X11 Release 24. Like the CPU and Memory noted previously, Meridian 1 Option 61C systems can also arbitrate their mass storage, so that should one CD ROM Drive Unit fail, the surviving unit picks up its duties in support of the communications network.
- **Input/output interfaces** provide an information exchange between the user and the CPU. Examples of this are the 10MB Ethernet Port that resides on the IODU/C cards. This port could be used, for example, as an interface for server-based system management of the Meridian 1 via either Meridian Administration Tools (MAT) or Optivity Telephony Manager (OTM). It also supports server-based applications such as Symposium Call Center Server (SCCS).

Network Equipment

Network Equipment performs the system switching functions for Meridian 1 by interconnecting peripheral ports for communication with each other. Meridian 1's network architecture is based on what is known as the digital multiplexed loop. A loop transmits voice, data and signaling information over a bi-directional path between the network and peripheral ports (i.e., peripheral ports support users at the desktop). Upon commands from the Meridian 1 core complex, Option 61C's networking equipment establishes a path, linking a specific input to a specific output. Network equipment for Option 61C consists of network circuit cards, known as Superloop Network Cards, which digitally transmit voice and data signals, and service circuits cards, referred to as Conference/Tone & Digit Switching (TDS) cards that provide call progress tones and outpulsing. Option 61C's networking architecture uses industry standard Space Switching and Time Division Multiplexing (TDM) technology to perform the switching functions in conjunction with Pulse Code Modulation (PCM) for digital sampling.

Meridian 1 Option 61C systems also deploy what is known as Segmented Bus Extension (SBE) architecture for timeslot allocation. This is a major advantage with the Meridian 1 design! Timeslot allocation is accomplished via the Superloop Network Cards noted above. Superloop Network Cards contain 4 ports – each of which provides 30 timeslots. A "loop" contains 32 timeslots. Meridian 1 takes up two timeslots for system processing and signaling purposes. Thus, the number of available timeslots is 30 per Superloop port or 120 per Superloop Network Card.

The SBE architecture enables a customer to flexibly configure these timeslots based on the individual workgroup needs of their business. For example, in a business with a Call Center, additional timeslots can be provisioned to support the Call Center where traffic demands would be higher for enhanced system resiliency. Conversely, for the front lobby or a warehouse, where traffic requirements may be less demanding, fewer superloops can be assigned for greater cost-effectiveness. Additionally, timeslots are automatically dedicated to high-traffic components such as digital trunks and voice mail in support of these mission critical elements. The result is cost-effective, reliable and scalable voice communications support for all types of businesses and applications.

Option 61C systems come standard with two Core/Network modules to accommodate superloop and service circuit cards. This combination provides up to 960 timeslots (480 per each network portion of the Core/Network Module) and is often referred to as a single network group system. A voice conversation (two-party) requires two timeslots, one for each participant on the system. Nortel Networks' channel partners utilize Erlang formulas to determine the maximum number of users any given Option 61C can support - taking into consideration the applications desired by the business, the software release proposed for the system and grade of service that is required (i.e., P.01 for example). This is called traffic engineering and Nortel Networks' channel partners are well trained and skilled in providing this service to customers. As a general guideline (and another to way to think of a network group) – one network group can support up to 2000 ports at nominal capacity.

Intelligent Peripheral Equipment (IPE)

Intelligent Peripheral Equipment (IPE) performs analog to digital conversion of all input signals before the network performs switching. Pulse Code Modulation (PCM) is used to convert analog signals to digital signals. The amplitude of the analog signal is sampled at a rate of twice the highest signal frequency and then is converted into a series of coded pulses. Eight kHz is the standard PCM sampling frequency and both A-law and μ-law standards are supported. IPE is provisioned on network loops based on the needs of your business. For example, customers that require a smaller footprint for their Meridian 1 system can opt to concentrate provisioning of their IPE on the least number of loops required, thereby reducing real estate requirements of the system. In turn, customers may opt to sacrifice a reduced footprint for even further system resiliency and in this case can "distribute" their IPE across a greater number of network loops. With Meridian 1 Option 61C systems, it is all about flexibility of choice. Built into the design of the Meridian 1.

Option 61C systems utilize the same IPE as that of the smaller systems in the portfolio (i.e., Option 11C). IPE is so named as it contains commercial based processors (Motorola 68020) that perform diagnostic functions, thus relieving the core complex CPU of this duty. Prior generation Peripheral Equipment (i.e., referred to as Peripheral Equipment (PE) or Enhanced Peripheral Equipment (EPE)) are also supported in many configurations on Option 61C systems.

IPE cards provide physical connections to the system and include 16 port Digital Line Cards, 16 port Analog/Message Waiting Line Cards and 8 port Universal Trunk Cards (in which each port can be individually configured within software for connections such as Central Office (CO), TIE Line, Outward Automatic Number Identification (OANI), Recorded Announcement (RAN) etc). In addition to these cards, there are integrated application servers, which are IPE based including the Integrated Conference Bridge (MICB) Card, the Integrated Recorded Announcer (MIRAN) Card, the Integrated Voice Services (MIVS) Card, the Integrated Personal Call Director (MIPCD) Card and the Integrated Call Assistant (MICA) Card.

Key Features

Features	Comments
Segmented Bus Extension (SBE) Architecture for cost-effective Voice Communication needs	Standard with Option 61C design. Incorporated into Superloop Network Card.
Robust Call Processing with the top-of-the-line Commercially Based Motorola CPU offering 135,000 BHCC	Motorola 68060E Call Processor. Installed base systems can upgrade to this processor via simple card exchange.
Scalability up to 2,000 ports[3]. Single Network Group System.	Standard with Option 61C systems
Five Nine's Reliability with Changeover Memory Arbitration (CMA) functionality	CMA (Standard design on Option 61C)
Scalable IP Telephony Solutions with IP Trunk, IP Line Side, IP Telephones	Supports ITG Trunk 1.0 & 2.0, ITG Line 1.0 (IP Telecommuter) & 2.0 (i2004 IP Telephones)
GUI Based System Administration	Meridian Administration Tools (MAT) or Optivity Telephony Manager (OTM)
Over 450 Software Features for Vertical and Horizontal Markets	Supports X11 Software.

[3] See footnote 1

Features	Comments
Addresses the Needs of Individual Workers at Home, Small Branch Offices or Large Scale Remote Site Needs.	Supports Fiber Remote, Fiber Remote Multi-IPE, Carrier Remote, Mini Carrier Remote, Remote Office 9110, 9115, 9150
Private, Public, Multi-Vendor Switch Interworking	Support for ISDN PRI, BRI, T-1, Q.Sig Networking

Solution Sets

Meridian 1 systems, because of their feature richness, address the needs of both horizontal and vertical market niches. Vendors of LAN-based PBX's contend that they offer the required features that an enterprise customer truly need. While for some businesses and selected departmental units this may be true, there are many more features than the some 30 – 50 currently offered with these third party LAN-based PBX solutions that are of importance to businesses. Many of these features are integrated into daily business practices and, if absent, would render a LAN-based PBX useless to the business. Here are just a few examples for consideration:

- Scheduled Access Restrictions, Automatic Route Selection and Coordinated Dialing Plan support for standard, cost-effective and non-user dependent service across corporate multi-site locations.
- Attendant Service, Maid ID and Room Status to increase customer service in the Hospitality segment
- Off Hook Alarm Security, Code Blue and Network Attendant Services for safety and service in the Healthcare segment.
- Charge Account Codes for service industry firms such as legal offices that rely on billable hours.
- Custom Local Area Signaling Service (CLASS) used to provide Calling Line ID functionality on CLASS compatible phones that is popular with Universities in the education segment.
- Hotlines, Overrides and Encryption for security in government installations
- Emergency 911 compliance to support regional legislation and provide increased safety to employees.

With Meridian 1 systems or our Succession CSE 1000 IP PBX, businesses benefit from the breadth and depth of our X11 software features along with the reliability and the scalability of our design.

Value Proposition

A key differentiator with an investment in Meridian 1 is that it is future safe. Nortel Networks and Meridian 1 have a proven track record of non-product obsolescence that dates back some 25 years with the introduction of the SL-1 system in the mid 1970's. This is known and recognized throughout the industry as our "Evergreen" investment protection and is one of the strongest values a customer receives by investing in a Meridian 1. What is Evergreen? Evergreen, in essence, provides the customer with a pathway to the latest technologies, if and when their business requires them. Systems introduced in the mid to late 1970's (SL-1 systems as they were then known) have a pathway to the latest system designs. For example, SL-1 systems such as SL-1 A, M, MS, ST can all migrate to an Option 61C. Should a business, at some point, have interest in a pure IP PBX solution (Succession CSE 1000) – their investment in Meridian 1 carries forward and is protected. Meridian 1 and Succession CSE 1000 can interoperate within your network – supporting the same i2004, i2050 desktop sets and X11 features. Truly, investment protection!

Here's another example of Evergreen in action. Suppose a customer has an Option 61C system now and needs to expand it to support additional users. Several choices are available to this customer. The customer can upgrade to an Option 81C if their future growth plans warrant and their investment in 61C components carries forward. Specifically, their IPE, CPU and many of their network cards (i.e., Superloop Network, DTI/PRI, Conference/TDS) carry forward. This is 90+ % investment protection. Or, the customer might consider VoIP

solutions if interested in running converged voice with their Option 61C. Using the ITG v2.0 Line Side Gateway and i2004 IP Telephones, customers can provision up to 96 users per 24-port Line Side Gateway. This results in greater desktop densities per IPE card slot and as a result, fewer IPE Cards and Modules are required reducing the footprint and costs of your Option 61C system. There are several benefits to a business with this approach. First, cost savings and footprint reduction with their Meridian 1 investment are obtained. Second, the business benefits from leveraging the existing bandwidth of their data network for their voice communications, making the data network more efficient. It's all about flexibility and protection of investment. That's a benefit with Meridian 1.

Reliability is another value that comes from an investment in Meridian 1. Previously, we noted the Segmented Bus Extension architecture (SBE) on Meridian 1 large system designs. Recall that this architecture provides cost-effective flexibility and reliability by enabling, via Superloop Network Cards, the ability to provision additional timeslots to workgroups that experience higher traffic (i.e., call centers). A greater number of timeslots equals additional reliability and responsiveness, all without additional hardware! In turn, fewer timeslots can be provisioned for greater cost effectiveness where lower traffic is observed.

Target Market

Option 61C systems are ideally suited for mid-range to large enterprises (i.e., from 200 up to 2000 users) that seek the robust feature set and reliability of Meridian 1. If your future growth plans extends beyond 200 users and a redundant core complex, which provides the Core Memory Arbitration or CMA infrastructure is desired, then the Meridian 1 Option 61C would be the system for consideration. Option 61C offers the robust processing power (Motorola 68060E with 135,000 BHCC support) and networking capabilities (Option 61C can act as a hub site supporting remotes with Fiber, Copper and IP Connectivity) that your business requires today and for the future. With investment in Meridian 1, businesses can adopt VoIP when they are ready – small or large scale. It's flexible design that offers customers the benefits of choice.

The modular design of Meridian 1 systems across the portfolio provides built-in scalability so that as your business needs expand, so too can your Meridian 1. And as with any system in the Meridian 1 family, the widely recognized "Evergreen" investment protection assures the investment you make in a Meridian 1 today will have a pathway to the latest technologies available.

From an independent industry analyst perspective, Option 61C would compete primarily in the 401 – 1000 line size segment, and depending on a customer's future growth plans, in the 1000 – 4000 segment. Option 61C would also be an entrant in the 101-400 line size segment where the redundant core architecture is desired (i.e., hospitals, police and fire departments, mid-size call centers etc.)

Product Codes

Order Number	Description
SY1016A or SY1016D (US)	Option 61C New System Hardware Package AC or DC
U9639A or U9639D (US)	Option 61C from SL-1A/M/S/MS/L/LE (23,96) /N/NT/ST/STE/RT/21A/21/21E Hardware Upgrade Package AC or DC
U9640 (US)	Option 61C from Option 61 CardCage Upgrade AC/DC
U9641A or U9641D (US)	Option 61C from Option 51 Hardware Upgrade Package AC or DC
U9646A or U9646D	Option 61C from Option 51C Hardware Upgrade AC or DC
QCA6135D or QCA6136D (CAN)	Option 61C New System Hardware Package AC or DC
QCA6591E (CAN)	Option 61C from Option 61C CardCage Upgrade AC/DC
QCA6592E or QCA6593E (CAN)	Option 61C from SL-1A/M/MS/S/ST/21/21E Hardware Upgrade Package AC or DC
QCA6594E or QCA6595E (CAN)	Option 61C from SL-1L/LE/N/NT/VLE/XL Hardware Upgrade Package AC or DC

Order Number	Description
QCA6601D or QCA6602E	Option 61C from Option 51C Hardware Upgrade Package AC or DC