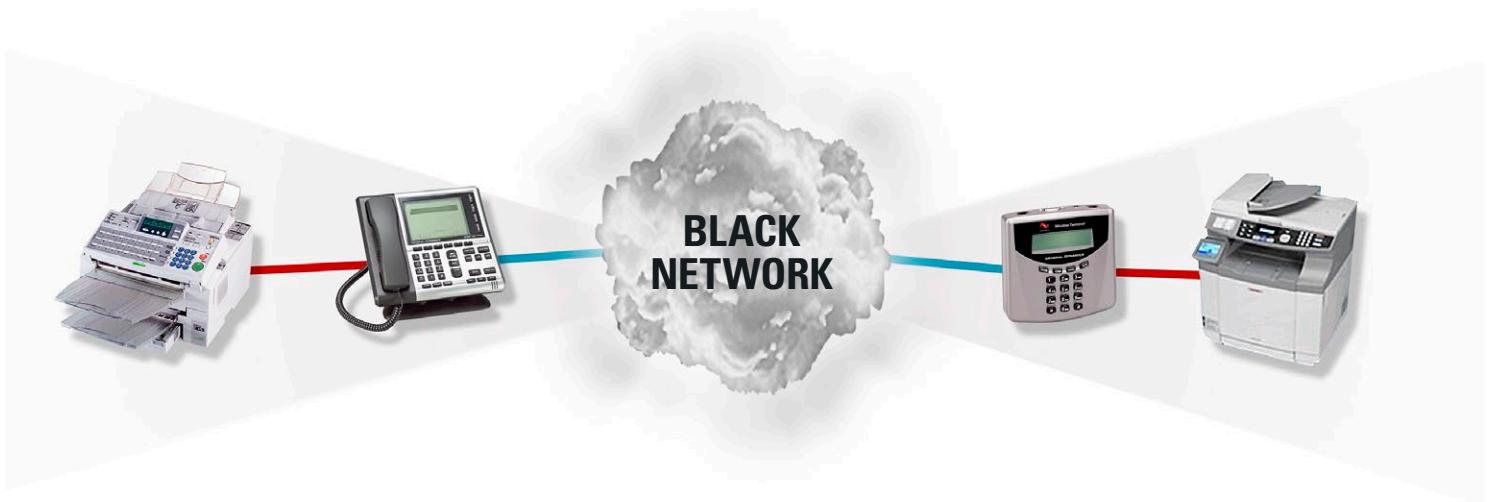


Secure Fax

New capability and interoperability standards



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GENERAL DYNAMICS
C4 Systems

Introduction

On December 31, 2009, the standard for secure fax capability dramatically changed. The STU III secure telephone that was once the industry standard for secure voice and fax capability, as well as the KOV-14 Fortezza card used to secure the STE device, is no longer permitted or available for use. With that, the Interoperable Synchronous Secure Data capability provided by these legacy desktop devices is being discontinued and a new secure fax technology is now needed to replace it.

The government has chosen to transition to Asynchronous Digital Secure Fax using the asynchronous secure data capabilities offered in Secure Communications Interoperability Protocol (SCIP) products. These asynchronous-capable SCIP End Cryptographic Units (ECUs), along with Asynchronous Digital Secure Fax machines, will be the new evolution for secure fax capabilities for the U.S. government.

This does not necessarily mean that you will need to purchase new fax machines. Most existing Synchronous Digital Secure Fax machines, from Ricoh, Ilex, Cryptek, and Gateway Fax Systems either already have built-in asynchronous capabilities, or are in the process of being upgraded to include these capabilities. Thus, most of the digital fax machines that are fielded and used in synchronous mode before, can also be used in asynchronous mode with the SCIP ECUs.

SCIP Secure Fax Solutions

SCIP is a multinational standard adopted by the U.S. government to ensure interoperability among telephony equipment regardless of manufacturer. General Dynamics C4 Systems offers a line of cost-effective secure voice and data, SCIP-compliant products that support the new government asynchronous digital secure fax standard. This line of products is called the Sectéra® family of personal communications devices. The Sectéra vPer™ Universal Secure Phone and the Sectéra Wireline Terminal (SWT) are most commonly used for secure data exchange.

Sectéra products are uniquely qualified to provide Type 1 secure fax capabilities for the widest array of government use cases. Sectéra secure fax solutions offer:

- Support for government transition to SCIP asynchronous protocols for secure fax
- Interoperability with existing and new digital secure fax machines and other SCIP devices
- Security of information classified Top Secret SCI and below

- Transmission over a wide array of networks:
 - PSTN
 - VoIP
 - ISDN
 - Cellular
 - SATCOM (Iridium®, GlobalStar, Inmarsat, and others)

An additional capability found in the Sectéra Wireline and BDI Terminals is the Analog Group 3 (G3) Secure Fax Capability. This feature enables low-cost, commercial fax machines to be used for secure fax of sensitive and classified information, therefore significantly saving costs for new installations.

The Sectéra® Secure Fax Solution

The General Dynamics Sectéra® family of products supports SCIP Asynchronous Secure Data and includes:



Sectéra vPer™ Universal Secure Phone



Sectéra Wireline Terminal (SWT)



Sectéra Black Digital Interface (BDI) Terminal



Sectéra Secure GSM Phone (SGSM)



Sectéra Edge™ Smartphone

Modern Secure Fax Installations and Networks

Figure 1 illustrates a variety of possible secure fax installations or scenarios utilizing the government's new Asynchronous Secure Data standard for secure fax. As shown in the diagram, the fax machines and SCIP ECUs support fax over PSTN, VoIP, ISDN, cellular networks, and even over a variety of SATCOM devices. All Sectéra ECUs, including Sectéra vPer Phones and Wireline terminals support all Asynchronous Digital Fax machines that:

- Utilize RS-232 standards
- Operate at standard asynchronous rates
- Utilize hardware flow control

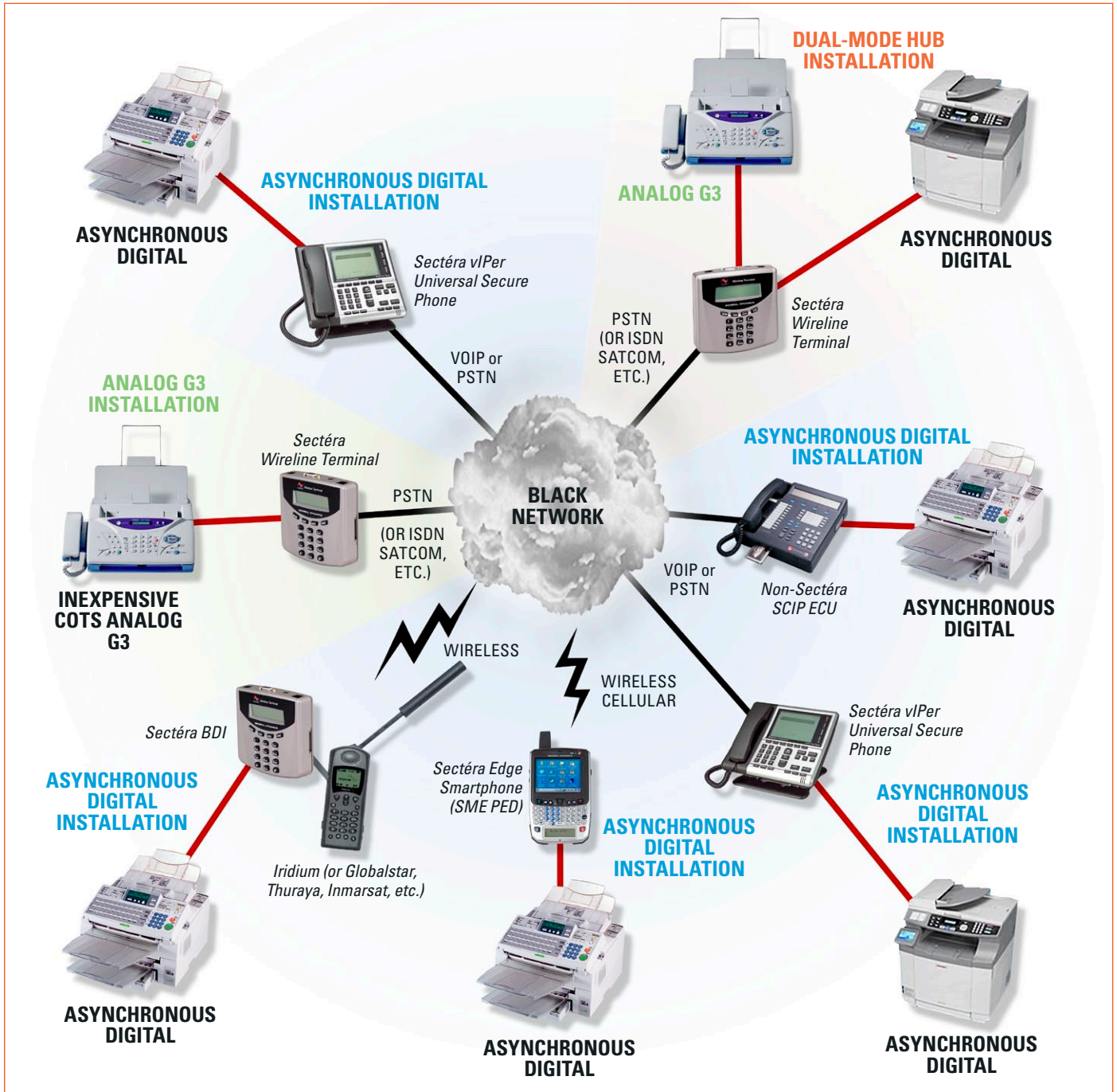


Figure 1
Secure Fax Installations and Networks

As illustrated in the diagram, Sectéra SCIP devices interoperate with non-General Dynamics Secure Fax installations, such as STE or OMNI ECUs. To ensure successful interoperability between ECUs:

1. All ECUs must be configured to use the government's recommended SCIP Asynchronous Secure Data transport mechanism
2. ECUS must be attached to Secure Fax machines with enabled interoperable asynchronous protocols

Low-Cost, Analog G3 Secure Fax

Analog G3 fax machines are low-cost commercial off the shelf (COTS) fax machines. The Sectéra Wireline Terminal and BDI Terminal are the only Type 1 SCIP devices available today that are certified to be used with G3 fax machines to transmit data securely via fax without any additional equipment or adapters. This scenario is also shown in Figure 1. This solution is the lowest-cost secure fax solution:



While this scenario is the most cost-effective solution, there are a few points of consideration to take into account:

1. The Analog G3 Secure Fax capability is not directly interoperable with all of the SCIP Asynchronous Digital Secure Fax installations. An analog G3 fax machine and a SWT or SWT-BDI are needed at both sending and receiving ends.
2. The analog G3 fax will not work over slower rate links such as Iridium; this scenario requires a black-side link rate of at least 9600 bps.
3. Consult with your local security authority to ensure that the Analog G3 Secure Fax installation is acceptable.

Dual-Mode Hub – Maximum Interoperability

The Dual-Mode Hub, also shown in Figure 1, is a secure fax installation that is capable of communicating to all of the SCIP Asynchronous Digital Secure Data fax installations, as well

as to the General Dynamics Analog G3 fax installations. It consists of:

- A single SWT or SWT BDI ECU
- An Asynchronous-capable digital fax machine
- An analog G3 fax machine

The only difference between this installation and a standard Asynchronous Digital Secure Fax installation is the addition of a single low-cost COTS analog fax machine. Thus, the “Dual-Mode Hub” provides complete interoperability with both Asynchronous Digital and Analog Secure Fax installations in the field, with only a minimal increase in cost over an Asynchronous Digital-only installation.

Interoperability

To ensure successful secure fax transmission, you must make sure that each ECU and fax machine are interoperable. Table 1 and Table 2 clarify interoperability between different types of Secure Fax installations. Using these two tables, you should be able to determine what kind of fax installations is optimal for your location.

Please note that maximum interoperability is achieved with the Sectéra Dual-Mode Hub, which can communicate with all other installations. The only exception is the STU-III Synchronous Digital installation, which as previously mentioned, is no longer permitted or available for use as of January 1, 2010.

Table 1
This table illustrates which ECUs and fax machines can be used per fax installation type

Secure Fax Installations	Possible Installation ECUs				Possible Installation Fax Machines				
	Sectéra SWT or SWT-BDI	Sectéra vPer & PSTN vPer	Sectéra Edge	Sectéra GSM	Ricoh Digital	L-3/ILEX Digital	Cryptek Digital	Gateway 90si/G3 Digital	COTS Analog G3
Sectéra SCIP Asynchronous Digital	✓	✓	✓	✓	✓	✓	✓	✓	
Sectéra Analog G3	✓								✓
Sectéra Dual-Mode Hub	✓				✓	✓	✓	✓	✓

Table 2
This table illustrates interoperability between different types of fax installations

Installation Interoperability	Sectéra SCIP Asynchronous Digital	Sectéra Analog G3	Sectéra Dual-Mode Hub	Non-Sectéra SCIP Asynchronous Dig
Sectéra SCIP Asynchronous Digital	✓		✓	✓
Sectéra Analog G3		✓	✓	
Sectéra Dual-Mode Hub	✓	✓	✓	✓

How to Configure Your Secure Fax Installation

For highest levels of interoperability with the maximum number of remote installations using the government's specified Asynchronous Digital Secure Fax mode, start out with the ECU and fax machine settings listed below. These settings are for a Ricoh SMFC210M; however, other Ricoh and non-Ricoh digital fax machines should have similar compatible settings.

Note:

- Adjustment of some settings may be necessary for some installations to improve performance.
- The government's recommended fax machine settings are subject to change as the government determines which settings to standardize. For updated information, check: <https://www.iad.gov/securephone/>

Steps:

1. Fax Machine (Rico) set to Mode 3. Alternative parameters shown in parenthesis are acceptable. The Ricoh Mode 3 parameters consist of:
 - Protocol: Asynchronous
 - Line Speed/Serial Port Rate: 9600 (higher is acceptable or even preferable as long as it matches ECU serial port rate)
 - Timeout: 30 seconds (higher is acceptable or necessary over some links)
 - Line Delay: 0 (higher numbers may be OK for some installations)
 - Duplex: Full Duplex
 - Compression: MR – Modified Read compression code
 - Flow Control: RTS/CTS (a.k.a. Hardware Flow Control)
 - Break: No

2. ECU set to utilize SCIP Interoperable Asynchronous Secure Data
3. ECU Red Data Port Serial Port rate set to match the Line Speed/Serial Port Rate of the fax machine. 9600 is standard for Ricoh's Mode 3, but higher speeds will often result in faster fax transmission. Matching serial port rates at both fax installations is not typically required in asynchronous data modes, as the hardware flow control capabilities will adjust flow to allow for speed mismatches.

General Dynamics Secure Fax White Papers

General Dynamics has three additional white papers on Secure Fax that go into the details of how to set up your secure fax machine using the Sectéra vPer Universal Secure Phone and the Sectéra Wireline Terminal or BDI Terminal. You can request the following whitepapers by emailing viperphone@gdc4s.com.

Using Sectéra vPer Phone with the Ricoh Secure Fax Machines for Secure Fax — This paper provides details for using Ricoh fax machines with the Sectéra phone. Note that this paper will also be applicable, with minor differences, for all of the other asynchronous digital fax machines from Ricoh and other vendors.

■ **Using the Sectéra Wireline Terminal and Sectéra Secure Module for GSM with the Ricoh SFX3900M and SFX2000M Fax Machines for Secure Fax** — This paper provides details for these two specific Ricoh fax machines for use with the SWT, SWT-BDI, and sGSM ECUs. Note that this paper will also be applicable, with minor differences, for all of the other asynchronous digital fax machines from Ricoh and other vendors.

■ **Secure G3 Fax Bulletin** — This paper deals specifically with General Dynamics' proprietary analog G3 secure fax implementation, detailed steps on how to select a fax machine, set it up, and configure all of the equipment for optimal operation.

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