

Project 25 and Zetron Consoles

Application Note

This Application Note provides an overview of Project 25 (P25), how it was developed, and why it is important. It also discusses Zetron's commitment to the development of P25 standards and explains how Zetron radio dispatch consoles support them.



P25 AND WHY IT MATTERS

P25 is a set of open standards developed for digital, two-way radio technologies that are used by public-safety agencies. P25 is extremely important because it allows radio technologies that adhere to its standards to interoperate with one another. This was the primary reason for developing P25 in the first place. Without this interoperability, radio communications among organizations that use different types of radios can be difficult if not impossible.

Public safety agencies that are awarded federal grants to obtain public-safety radio equipment are required to use these funds to obtain radio equipment that complies with published P25 standards. To be deemed "P25 compliant," the equipment must meet the published standards for P25 equipment as outlined in the P25 Statement of Requirements developed by the P25 Steering Committee.

THE ORIGINS AND DEVELOPMENT OF P25

P25 was initiated by the Association of Public-Safety Communications Officials (APCO) – International. Their goal in creating P25 was to develop open standards for digital two-way radio technologies to ensure that they would meet the needs of public safety organizations.

The Telecommunications Industry Association (TIA), a recognized telecommunications standards-development organization, is responsible for publishing P25 standards for APCO. TIA formed TR8-Engineering Committee to help develop these standards. The TR8-Engineering Committee consists of subcommittees of radio users and manufacturers that work on various aspects of the P25 standards.

ZETRON'S CONTRIBUTION TO P25

Zetron is an active participant in the TR8-Engineering Committee and a contributing member of the Project 25 Technology Interest Group (PTIG). This means that Zetron plays an important role in the development of standards. It also helps ensure that Zetron products support those standards as they evolve.

INTERFACE POINTS AND STANDARDS

There are many TIA-defined interface points between the system components in a P25 system. They include various over-the-air, data, and wire-line interfaces. The diagram below illustrates TIA interface points in a P25 system.

Each interface point has its own set of standards publications, which generally consist of a suite of documents: an *overview* document, *messages and procedures*, *measurement methods*, *performance recommendations*, *compliance test*, and *interoperability test*.

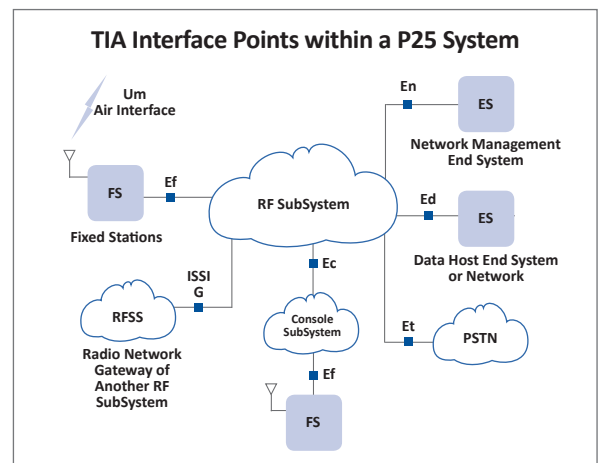
The *messages and procedures* document describes the implementation of the interface. The other documents (except the *overview*) explain how to test the implementation against the *messages and procedures* document to ensure compliance with a particular standard.

STANDARDS THAT APPLY TO DISPATCH CONSOLES: FSI AND CSSI INTERFACES

According to the primary P25 overview, TIA102A, there are two wire-line interfaces that pertain to radio dispatch consoles:

- Fixed Station Interface (FSI or Ef)
- Console SubSystem Interface (CSSI or Ec)

The FSI is used for making a direct connection between consoles and conventional base and repeater stations. It is available in either an analog (AFSI) or IP-based digital (DFSI) interface.



Zetron Console P25 Radio Interface Capability Summary

This table provides an overview of Zetron consoles and the features supported for each P25 interface option. Some of the features listed may require the addition of certain manufacturer options.

Feature	FIXED STATIONS							MOBILE RADIOS				
	Motorola Quantar ASTRO P25	Tait TB9100 P25	Codan MT-4 P25	Simoco SB 2025CNT P25	Spectra Engineering MX-800 P25	RELM S & SD P25	Kenwood TK-5710/5810	Harris M7100	Harris M7300	EF Johnson 5300 ES	Motorola XTL 5000 APX 7500	
Supported Zetron Consoles	AcomEVO							AcomEVO				
	MAX Dispatch							MAX D				
	Series 4000							Series 4000				
Console Wireline Interface	Digital/ Analog via Pathway	Analog via Motorola DIU-3000	TIA DFSI, Analog via Tait Analog Line Option	TIA DFSI, Analog via Base Control Card	TIA DFSI, Analog via Central NI	TIA DFSI	TIA DFSI	Zetron iRIM MRG	Analog via Zetron WIM	Analog via Zetron MRG/ WIM	Analog via Zetron iRIM	Analog via Zetron MRG
Supported Modes	Conventional							Conventional and Trunked				
Fixed Station Control												
Analog (FM) & Digital (CAI) RF Mode Selection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	TBD	Yes	Yes	No
Coded/Clear Encryption Selection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	TBD	Yes	Yes	Yes
Encryption Key Selection	Yes	Yes	Yes ⁵	No	No	No	No	Yes	Yes	Yes	Yes	No
Frequency or Talk Group Selection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CTCSS/DCS or NAC Monitor	Future	Yes	Yes	NAC Only	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Squelch Enable/Disable	No	No	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No
Repeated or Talk Around Mode Selection	Yes	No	Yes	Yes ⁶	Yes	Yes	Yes	Yes	Yes	TBD	Yes	No
Scan On/Off	Yes	No	No ⁵	No ⁵	No ⁵	Future	Future	Yes	Yes	TBD	Yes	Yes
Site Intercom	Future	Yes	Yes ⁵	Yes ⁵	Yes ⁵	Future	Future	No	No	No	No	No
Dispatcher Interrupt	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No
Encryption Key Loading	Yes ⁴	Yes ⁴	Yes	Yes	Future	Future	Future	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴
Subscriber Unit Signaling												
Incoming/Outgoing Group Call	Yes	Yes	Yes ¹	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Incoming/Outgoing Emergency Group Call	Yes	Yes (no M4010)	Yes ¹	Yes ⁶	Yes ⁶	Yes	Yes	Yes	Yes	Yes	Yes ³	Yes
Receive PTT-ID Display	Yes	Audible Only	Yes ¹	Yes	Yes ⁶	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Incoming Emergency Alert Indication	Yes	Yes (no M4010)	Yes ¹	Yes ^{1,6}	Yes ⁶	Yes	Yes	Yes	Yes	Yes	Yes ³	Yes
Incoming Status Display	Yes	No	Yes ¹	Yes	Yes ⁶	Yes	Yes	No	No	No	No	No
Radio Individual Call (without ack)	Yes	No	Yes ¹	^{1,6} Yes	Yes ⁶	Yes	Yes	No	Yes	TBD	No	Yes
Radio Call Alert (with ack)	Yes	No	Yes ¹	^{1,6} Yes	Yes ⁶	Yes	Yes	No	Yes	TBD	No	Yes
Radio Check	Yes	No	Yes ¹	^{1,6} Yes	Future	Yes	Yes	No	No	TBD	No	No
Radio Status Check	Yes	No	Yes ¹	Future	Future	Yes	Yes	No	No	TBD	No	No
Radio Monitor	Yes	No	Yes ¹	Future	Future	Yes	Yes	No	No	TBD	No	No
Radio Enable/Disable	Yes	No	Yes ¹	Future	Future	Yes	Yes	No	No	No	No	No

1. Tait supports subscriber-unit signaling mapping for 24-bit unit IDs to 16-bits on its analog interface. Codan plans to add subscriber unit signaling in the future.
2. The TIA 102.BAHA Fixed Station Interface Standard does not require these features, but permits them through a manufacturer option.
3. When the emergency indication is used with the RS-5300ES, it works for P25 priority transmissions where audio is sent along with the emergency notification. The emergency-status transmission, which occurs without audio, also works if all emergency transmissions are steered to a specific, conventional channel or trunking talk-group.

Feature	Radio	RFSS						
		Airbus DS Communications COR P25	TaitNet P25 Trunked System	Raytheon P25net	Auria Wireless & Metro P25	Motorola ASTRO25 7.13	Harris P25 IP	Codan
Supported Zetron Consoles	AcomEVO							
Console Wireline Interface	Airbus CSSI, TIA CSSI Phase 1	TIA CSSI Phase 1	TIA CSSI Phase 1	TIA CSSI Phase 1	TIA CSSI Phase 1/2	TIA CSSI Phase 1/2	TIA CSSI Phase 1	TIA CSSI Phase 1
Supported Modes	Trunked							
Fixed Station Control								
Analog (FM) & Digital (CAI) RF Mode Selection	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Coded/Clear Encryption Selection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Encryption Key Selection	Future	Future	Future	Future	Future	Future	Future	Future
Frequency or Talk Group Selection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CTCSS/DCS or NAC Monitor	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Squelch Enable/Disable	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Repeated or Talk Around Mode Selection	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scan On/Off	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Site Intercom	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dispatcher Interrupt	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Encryption Key Loading	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subscriber Unit Signaling								
Incoming/Outgoing Group Call	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Incoming/Outgoing Emergency Group Call	Yes	Yes	Yes	Yes	Yes	Future	Yes	Yes
Receive PTT-ID Display	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Incoming Emergency Alert Indication	Yes	Yes	Yes	Yes	Yes	Future	Yes	Yes
Incoming Status Display	Yes	Yes	Yes	Yes	Future	Future	Yes	Future
Radio Individual Call (without ack)	Yes	Yes	Yes	Yes	Future	Future	Yes	Future
Radio Call Alert (with ack)	Yes	Yes	Yes	Yes	Yes	Future	Yes	Future
Radio Check	Yes	Yes	Yes	Yes	Future	Future	Yes	Future
Radio Status Check	Yes	Yes	Yes	Yes	Future	Future	Yes	Future
Radio Monitor	Yes	Yes	Yes	Yes	Future	Future	Yes	Future
Radio Enable/Disable	Future	Future	Future	Future	Future	Future	Future	Future

4. Key loading is done directly into the radio or fixed station.

5. Analog only.

6. DFSI only.

The CSSI is used for connecting to the switch network (RF SubSystem [RFSS]) of a trunking or large conventional system. It is available only as an IP-based digital interface.

The CSSI and DFSI are open-standard, IP-based interfaces. Zetron supports both of these direct IP interfaces and also supports a direct-IP-based Airbus DS Communications proprietary interface.

ZETRON P25 CONSOLE OPTIONS

Zetron has developed several options for interfacing its consoles to P25 radios. These include: wired fixed-station interfaces, a wireless subscriber-unit interface, and a wired RFSS interface.

Wired fixed-station interfaces

Zetron consoles can interface to a variety of conventional fixed stations manufactured by Motorola, Tait, Codan, Simoco, Spectra Engineering, and RELM, using the Analog Fixed Station Interface. The interfaces permit control of fixed-station functions, including RF mode, channel selection, and coded/clear mode. In some cases, subscriber-unit signaling is also supported. Zetron's Acom Advanced Communications (AcomEVO) system and MAX Dispatch system also allows interfacing using the Digital Fixed Station Interface to TIA 102. BAHA compatible fixed stations like Tait's TB9100, Codan's MT-4 P25 radio system, Simoco's SB2025C/NT, and Spectra Engineering's MX-800. These interfaces permit a higher level of Subscriber unit feature control. Please refer to the table.

Wireless subscriber-unit interface

Zetron consoles can interface to EF Johnson RS-5300ES, Kenwood TK-5710/5810, and Harris M7100 and M7300 mobile radio and Motorola in either conventional or trunked modes. This permits control of radio functions such as selection of channel/talk-group, coded/clear selection, scan, and PTT ID. This also supports PTT-ID display and emergency alert.

Wired RFSS interface

Zetron's AcomEVO can interface to the Airbus DS Communications CORP25, Motorola, ASTRO 25, TaitNet P25, Raytheon P25net, Auria Wireless/MetroP25, Harris P25 IP, and Codan trunked systems by using the IP-based TIA-CSSI. The system is capable of connecting to either Phase 1 or Phase 2 P25 systems depending on whether the Radio Vendor supports Phase 2 operation. All of Zetron's consoles are able to use Tone Remote Control (TRC) to interface to the Harris P25 IP trunked RFSS through Harris' Interoperability Gateway.



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