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Initially drafted by/on	G. Ukrainsky 28/03/12
Rev 1	06/03/12
Rev 2	06/06/12 translated
	English . Pages 3/3

9300-series Antennas Connection Port

Connectors and cables

The 9300 antenna External Connection Port is located at its die cast base and comprises: a) UHF female 50Ohms RF I/O connector; b) Bayonet 7-line female connector; c) Chromed copper braid strap RF-ground return.

To deliver utmost radiation performance of the 9300 antenna system, RF-ground return strap must be reliably bolted to vehicle bodywork and connected with TRV's 50 Ohms RF I/O using high quality RF-cable. For basic operation 9300 requires only 2-wires (+12VDC and GND) connection with vehicle's battery. For intelligent operation 9300 requires connection with TRV's 4-6 wires External Tuner Control Port (including GND and +12VDC). Connection is conveniently provided through use of standard 6m Control Cable 9300.B17.060, terminated at TRV side by circular (T707) type 7-pin connector. This (T707) connector pinouts is proprietary standard for all Stealth External Antenna Control (SEAC) connections with set of 0.5m Adaptor Cables, terminated with variety of proprietary TRVs plugs.

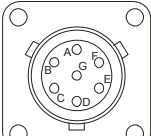

Bayonet 62IN-12E-10- 7S(624) (Antenna base)	Pin	Circular T707 9300.B17.060 Control Cable (SEAC)	Pin	Pin Name	CPS9300-programmable SEAC Line Configurations
 <p>Mating Side</p>	A	 <p>Mating Side</p>	6	+12V	+12V from TRV's relay, or +12V from battery with Pin4 used as Power Switch trigger when TRV is weak/protected
	B		5	IND	(TTL)↑↓IND, or not used
	C		4	SCAN/POWER SWITCH	(TTL)↑↓SCAN, or 0V/+12V trigger input of +12V Switch@Pin6, or not used
	D		3	DATA RX	UART(RS-485, RS-232), or not used
	E		2	DATA TX	UART(RS-485, RS-232), or not used
	F		1	GND	GND
	G		7	TUNE	(TTL)↑↓TUNE, or not used

Table 1. SEAC Configurations

Antenna power supply. Powering ON/OFF

9300 series antennas are designed to work from 13.6V (12V nominal) vehicular battery. With this voltage the antenna DC-current drain in different modes is as follows:

Power ON: 12A/1mS (680uF charge)
Standby: 250mA
Startup of 12-30VDC converter: - 5.5A/15mS
TUNING start: - 4.5A/20mS
TUNING spin: - 1.6...1.9A

Thus, the 9300 antenna can be directly fed from tuner control port only from TRVs that provide not less than 6A_{rush}/2A_{spin} current at the relay taped external 12VDC output line. In such case antenna turns on and off automatically using ON/OFF switch at the TRV control panel. To provide DC power to the antenna from TRV with lower current capability at the +12VDC line of external antenna port, wire 7(+12V red) must be connected directly to the vehicle's battery Positive (+) terminal, while +12VDC line at the external antenna port will be used as a signal to trigger built-in antenna power switch circuit.

Note 1: In case of use of a TRVs designed to powering external antennas/tuners through the central conductor of coaxial cable, the same central conductor shall be reconfigured using CPS9300 to act as Pin4 to trigger built-in antenna power switch circuit.

With this in mind, control of the antenna with the standard TRV controls allows switching on and off the antenna by a single ON/OFF knob on the transceiver panel, i.e. regardless of the restrictions from tuner control ports, which may occur in various TRV models.

Note 2: For a TRV not equipped with any external tuner/antenna control port, powering and turning 9300 antenna ON and OFF can be arranged, for example, by direct connection to cigarette lighter port or other suitable +12 VDC line deactivated by ignition key or dedicated custom made On/Off switch. If SMART mode is selected in the CPS9300 menu, antenna tuning cycle will be launched automatically when 3-200W RF carrier is applied to the antenna input. SMART Mode is useful for operating TRVs equipped by unknown or not supported interface in the CPS9300 menu. However, some of the transceiver features (ALE) can be limited.

Thus, the style of the antenna powering is determined by the combinations of CPS9300 settings and adaptor cables, or use of central conductor of the coaxial cable.

Interface hardware configuration. Assigning of signals.

In addition to the above-mentioned +12V wire on SEAC port, there are 6 control signals, which are described below according to the reassigning signals pinouts as shown in Table 1.

Signals IND and TUNE are two-way TTL signals (with respect to GND (1)), i.e. able to change its state from both, antenna and TRV. Signal SCAN / POWER SWITCH can be used similarly to logic signals IND and TUNE, as well as CPS9300-reconfigured to trigger the internal power switch by +12V line, as indicated above. In this case, all other functions on the SCAN signal are lost.

Signals DATA RX and DATA TX, depending on the configuration of CPS9360 (type of transceiver interface, conventionally designated as IntA, IntB, etc.), may be set in accordance to the requirements of the signal as per UART or RS-485.

In addition to the above signals, the RF-carrier must be received at the central pin of coaxial connector (considered as a signal starting the tuning cycle) for all SEAC configurations, as well as for TRV's connected without any control cable, where the central conductor of the coax performs control cable functions by switching the antenna ON/OFF, and passing a short "zero" pulse (considered as logic) sent by TRV to start tuning cycle.

Hence, flexibility of interfacing with a variety of TRV's is provided with 4 versions of the interface configurations, accomplished by CPS9300 settings and selection of standard adaptor cables.

Note3: GND is common for the logic, power supply and RF.

Interface configurations

IntA (MICOM-Motorola style)

IntA DC-power uses central conductor of coaxial cable and wires 1 and 6 directly connected to the battery. The standard 6m Control Cable 9300.B17.060 cable (along with two-wire adaptor cable) in this case is used only as power cable overriding usage of central conductor of coaxial cable as +12VDC power line. The central conductor voltage is used as trigger of ON/OFF SWITCH only. Antenna switches ON when +12 VDC supply appears on the central conductor of the coax cable together with TRV ON/OFF knob. Tuning cycle starts by short (5 ms) drop on +12VDC provided by TRV on the central conductor of coax cable.

IntA allows to use 9300 without any control interface (even without +12VDC on the central conductor of the coax cable, in SMART mode). Turning the antenna ON in this case cannot be done from the TRV, but only by direct feed from the 12V onboard battery. Tuning cycle startup is performed by injecting 3-200W RF carrier to the antenna RF-input for approx1 second.

IntB (Codan, Barrett, AT-140/130 style)

IntB uses TTL signals IND, SCAN and TUNE only.

Serial exchange signals DATA RX and DATA TX are not used. Adapter cables with direct powering from TRV or overriding connections to vehicle battery can be used, depending on load capacity of the external antenna +12VDC line of the TRV.

Typical functions:

- radio sends command to start a tuning cycle
- antenna confirms starting of a tuning cycle
- antenna reports of successful tuning
- antenna reports of unsuccessful tuning
- control can be extended (e.g. LNA control, depending on the settings in CPS9360) through the transfer of certain functions of the control algorithm within the transceiver).

This configuration provides a good RFI protection and sufficient number of signals to support most of basic functions (ALE) enhanced by control of LNA. A truncated (minus SCAN) **IntB** version can also be used, but without the ability to control LNA.

IntC (Yaesu/Vertex, Kenwood style)

IntC uses of TTL signals IND, SCAN, TUNE in conjunction with SEAC lines 2 and 3, configured by CPS9300 as UART (serial, full duplex through the DATA RX and DATA TX)

Note 4: Due to the low UART immunity to the RF, it is recommended to remove an RF power at the time of the exchange on lines (2) DATA RX and (3) DATA TX.

Adapter cables with direct powering from TRV or overriding connections to vehicle battery can be used, depending on load capacity of the external antenna +12VDC line of the TRV.

Typical functions:

- radio sends command to start a tuning cycle
- antenna confirms starting of a tuning cycle
- antenna reports of successful tuning
- antenna reports of successful tuning
- transceiver controls any software-accessible device (LNA, matching transformers, T1-T3, motor brake, etc.) as well as automatic remapping of transceiver buttons to control the antenna when transceiver functions are similar to those in the antenna, if the 9360 is selected in the TRV menu).
- Organizing of queries and transfer of data (FWD, REF power, temperature sensor, motor address in relation to the successfully tuned channel frequency.
- Tracking on the channels and frequencies (subject to the selected accuracy and subject to the prior reading of the antenna signature, performing ALE algorithm.
- Antenna initialization (photo sensor status display).
- Determining the compatibility of the antenna and TRV software and transfer of a processor S/N.
- Cloning frequencies stored in the antenna memory to the radio (in the case of TX = RX).
- Transfer antenna memory control from the antenna to the transceiver (frequency tracking with simultaneous control of motor address and matching transformers configuration).
- Registration of strong radiation from nearby transmitters to protect transceiver input by applying ATT and sending various reports.

IntD (STEALTH style)

IntD uses TTL signals IND, SCAN and TUNE along with serial exchange DATA RX and DATA TX in RS485 configuration. Functionally equal to capabilities of **IntC**. High degree of RFI-immunity allows reliable exchange of data while transmitting RF-power. Provides half-duplex data exchange.

Adapter cables with direct powering from TRV or overriding connections to vehicle battery can be used, depending on load capacity of the external antenna +12VDC line of the TRV.

Recommended for intelligent control of mobile and base station type antennas with long cable routing.