



Wireless Communications Module Stand-Alone HE200WCM910 and SmartStack HE800WCM900 / HE-WCM900*

* HE- denotes plastic case.

This datasheet also covers products starting with IC300.

Additional technical information is found in the following supplements: HE200WCM910 (MAN0782) and HE800WCM900 / HE-WCM900 (MAN0789). See the **Technical Support** section in this document to obtain manual updates.

1 DESCRIPTION

a. Wireless Communications Modems (WCM)

The Wireless Communications Modems (HE200WCM910 and HE800WCM900 / HE-WCM900) have outstanding sensitivity and are two of the longest-range, low-cost radio modems available. The WCM provides wireless serial communication links in a large variety of applications. The WCM takes serial data from the OCS/RCS RS-232 port and sends out frequency hopping spread spectrum data to a receiving WCM.

This datasheet covers two kinds of Wireless Communication Modems (WCM):

Note: The stand-alone WCM910 and the SmartStack WCM900 are not compatible – they can not be used together.

- The HE200WCM910 (WCM910) is a **stand-alone WCM** comes with a *non-articulating* antenna, which **is** suitable for indoor or outdoor use.
- The HE800WCM900 / HE-WCM900 (WCM900) is a **SmartStack module** that is connected to a controller as part of its I/O stack. It comes with an *articulating* antenna, which is suitable for indoor use but **not** suitable for outdoor mounting.

Note: Unlike most SmartStack modules, the WCM900 must be connected to the OCS/RCS RS-232 port using an external cable. The data is not accessed through the backplane of the OCS/RCS.

Note: When used with OCS250, a Revision B or later of a WCM900 is required.

b. Antenna Kits

Horner APG offers antenna kits, which *include* a bulkhead-mounted **antenna** (suitable for indoor/outdoor use) **and** an **extension cable** to extend the RPSMA RF connections to the outside of the panel. **In general, the shorter the RF cable, the better.** Two antenna kits are available:

- HE200ANT906 comes with a **1-foot long** extension cable
- HE200ANT908 comes with a **4-foot long** extension cable.

| Antenna ANT906 and ANT908 Specifications | |
|--|--|
| Connector | RPSMA (Right Angle) |
| Type | ½ wave dipole, 2.11" (5.35 cm), -1.96 dBi Gain |

Two Instances When You Need To Consider Getting An Antenna Kit:

If you do not want to connect the antenna directly to the WCM, an antenna kit allows you to remotely mount the antenna away from the WCM.

- If you are using an WCM900 and need to mount it outdoors, an antenna kit is required. (The antenna that comes standard with the WCM900 is not suitable for outdoor mounting.)

Note: The included antenna *as well as the optional antenna kits* do not satisfy the antenna requirements for *all* applications. Please contact **Technical Support** for antenna/cable selection assistance and/or optional services (e.g., site surveys, etc.). See the **Technical Support** section in this document for contact information.

2 SPECIFICATIONS

2.1 WCM900 SmartStack Specifications

| Table 1 – WCM900 Specifications | | |
|---|---|---------------------|
| Performance | @ 9600 bps Throughput Data Rate | |
| Transmit Power Output | 100mW | |
| Indoor/Urban Range | 1,500 Feet (457 m) | |
| Outdoor RF line-of-sight Range | Up to 7 miles (11 km) w/ dipole antenna Up to 20 miles (32 km) w/ high-gain antenna | |
| Interface Data Rate (selectable using BD Command) | 10 - 57600 bps | |
| RF Data Rate | 10000 bps | |
| Receiver Sensitivity | -110 dBm | |
| Power Requirements | | |
| Required Power (Power from OCS) | During Transmit | 0.8W (33mA @ 24VDC) |
| | During Receive | 0.3W (13mA @ 24VDC) |
| | During Power Down | 50μW (2μA @ 24VDC) |
| General | | |
| Frequency | 902-928 MHz ISM Band | |
| Spread Spectrum | Frequency Hopping | |
| Modulation | Wide Band FM | |
| Supported Network Topologies | Peer-to-Peer, Point-to-Point, Point-to-Multipoint & Multidrop | |
| Channel Capacity | 7 hop sequences share 25 frequencies | |
| Physical Properties | | |
| Weight | 7.1 oz. (200 g) | |
| Operating Temperature | 0 to 60° C | |
| Antenna | | |
| Connector | RPSMA (Reverse-polarity SMA) | |
| Type | ½ wave dipole whip, 6.75" (17.1 cm), 2.1 dBi Gain | |
| Impedance | 50 ohms unbalanced | |
| Certifications | | |
| FCC Part 15.247 | OUR-9XSTREAM | |
| Industry Canada (IC) | 4214A-9XSTREAM | |
| CE | See Compliance Table at http://www.heapg.com/Support/compliance.htm | |
| UL | | |

2.2 WCM910 Stand-Alone Specifications

| Table 2 – WCM910 Specifications | | | |
|---|---|--|-------|
| Performance | @ 9600 bps Throughput Data Rate | @ 115200 bps Throughput Data Rate | |
| Transmit Power Output | 1 mW - 1 W (software selectable) | 1 mW - 1 W (software selectable) | |
| Indoor/Urban Range | Up to 3000' (900 m) | Up to 1500' (450 m) | |
| Outdoor RF line-of-sight Range | Up to 14 miles (22 km) w/ dipole antenna Up to 40 miles (64 km) w/ high-gain antenna | Up to 7 miles (11 km) w/ dipole antenna Up to 20 miles (32 km) w/ high-gain antenna | |
| Interface Data Rate (selectable using BD Command) | 1200 - 230400 bps | 1200 - 230400 bps | |
| RF Data Rate | 10000 bps | 125000 bps | |
| Receiver Sensitivity | -110 dBm | -100 dBm | |
| Power Requirements (Refer also to Transmit Power Output specifications in this table.) | | | |
| Receive Current | 110 mA | 110 mA | |
| Idle Currents | 16 sec cyclic sleep (SM=8) | 20 mA | 19 mA |
| | 8 sec cyclic sleep (SM=7) | 21 mA | 19 mA |
| | 4 sec cyclic sleep (SM=6) | 24 mA | 20 mA |
| | 2 sec cyclic sleep (SM=5) | 30 mA | 22 mA |
| | 1 sec cyclic sleep (SM=4) | 39 mA | 25 mA |
| Pin Sleep Power Down | 17 mA | 17 mA | |
| Serial Port Sleep Power Down | 45 mA | 45 mA | |
| General | | | |
| Power Supply Voltage | 7 – 28 VDC | | |
| Frequency | 902-928 MHz ISM Band | | |
| Spread Spectrum | FHSS (Frequency Hopping Spread Spectrum) | | |
| Modulation | FSK (Frequency Shift Keying) | | |
| Supported Network Topologies | Peer-to-Peer, Point-to-Point, Point-to-Multipoint & Multidrop | | |
| Channel Capacity | 10 hop sequences share 50 frequencies | | |
| Physical Properties | | | |
| Size | 2.75" x 5.50" x 1.124" (7.90 cm x 13.90 cm x 3.80 cm) | | |
| Weight | 7.1 oz. (200 g) | | |
| Serial Connector | DB-9 | | |
| Operating Temperature | -40 to 85° C (industrial) | | |
| Antenna | | | |
| Connector | RPSMA (Reverse-polarity SMA) | | |
| Type | ½ wave dipole, 1.75", 2dBi (or greater) gain | | |
| Impedance | 50 ohms unbalanced | | |

| Certifications | | | | | |
|--|--|--------|--------|--------|--------|
| FCC Part 15.247 | Please refer to the Horner website for current certifications. | | | | |
| Industry Canada (IC) | | | | | |
| CE | | | | | |
| UL | | | | | |
| Transmit Power Output (TX Currents Relative To Each TX Power Output Option) | 1 mW | 10 mW | 100 mW | 500 mW | 1 W |
| Transmit Current @9600 baud (9 VDC supply voltage, typical) | 110 mA | 145 mA | 250 mA | 510 mA | 900 mA |
| Transmit Current @115K baud (9 VDC supply voltage, typical) | 110 mA | 140 mA | 245 mA | 500 mA | 800 mA |

3 DIMENSIONS

3.1 WCM900 Dimensions

a. WCM900 Dimensions (Shown as part of SmartStack I/O in OCS Controller)

The WCM can be used with any model of OCS. The example below uses an OCS1xx and shows four SmartStack modules attached – one of which can be a WCM.

Note: Figures 1 and 2 do not show dimensions for the WCM antenna. Refer to Figure 3 for antenna dimensions. **WCM antenna dimensions need to be considered for panel box dimensions.**

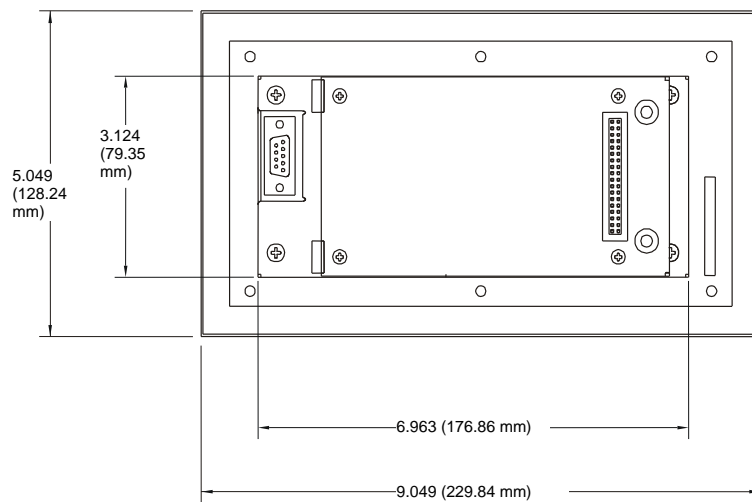
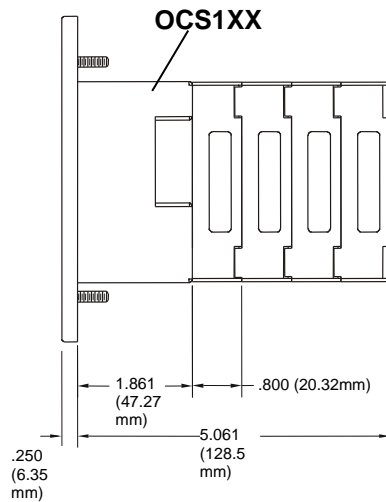


Figure 1 –Side View of OCS1XX

Figure 2 - Back View of OCS1XX

Note: OCS1xx Shown with Four SmartStack Modules-one of which can be a WCM.

b. WCM900 Antenna Dimensions

| Table 3 – WCM900 Antenna Dimensions | | |
|-------------------------------------|------------------|-------------------------|
| | A | B |
| WCM900 | | |
| Folded | 6" (152.4mm) | 1.5" (38.1mm) Folded |
| Straight | 6.75" (171.45mm) | |

Figure 3 shows the antenna that is included with WCM900. The **articulating** antenna included with the WCM900 is **not** suitable for outdoor mounting.

For remote mounting of the antenna or if an antenna is required that is suitable for outdoor mounting, refer to antenna kits on page 1.

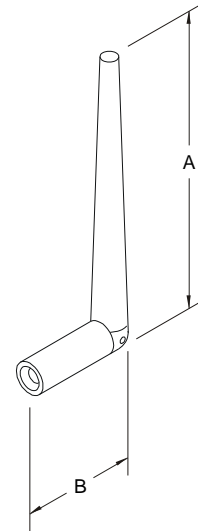


Figure 3 –WCM 900 Antenna Dimensions (Shown Folded)

3.2 WCM910 Dimensions

a. WCM910 Dimensions Stand-Alone

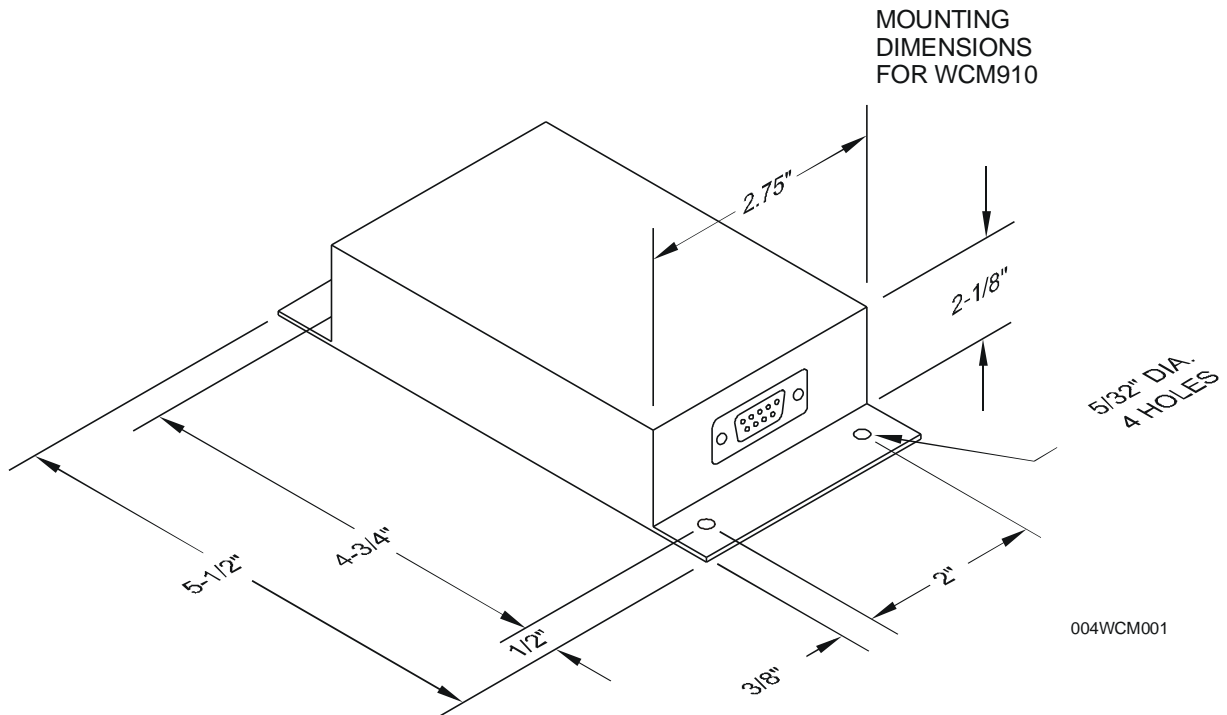


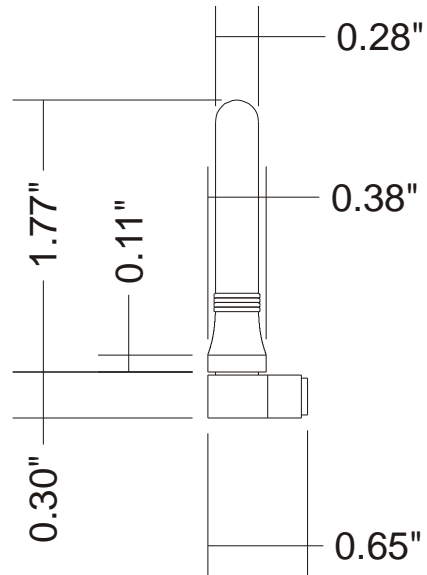
Figure 4 – Dimensions of WCM910 (Does not include Antenna Dimensions)

Note: WCM antenna dimensions need to be considered for panel box dimensions.

b. WCM910 Antenna Dimensions

Figure 5 shows the antenna that is included with WCM910.

The *non-articulating* antenna included with the WCM910 IS suitable for outdoor use. For remote mounting of the antenna refer to antenna kits on page 1.

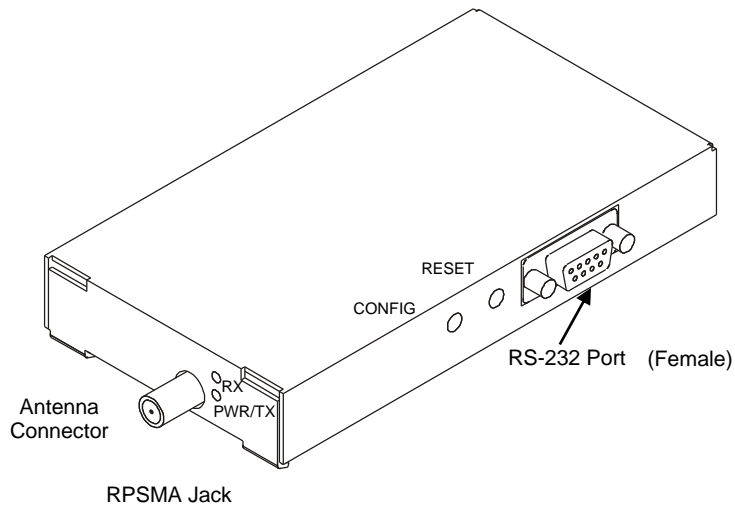


004WCM003

Figure 5 –WCM 910 Antenna Dimensions

4 CONNECTORS, ANTENNA, AND RF CABLING

4.1 WCM900 Connectors



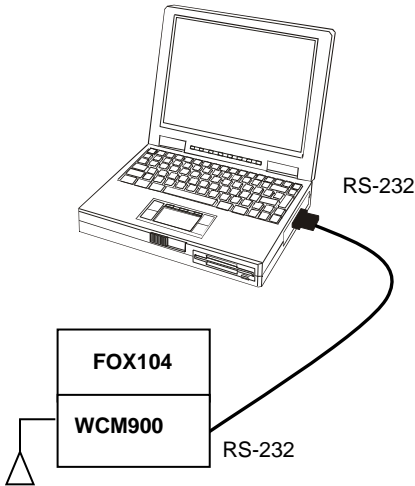
Note: RP = Reversed Polarity. The center of the conductor of the jack on the modem is Male.

Figure 6 – WCM900 Connectors

Figure 7 shows cables between the WCM900 and the OCS/RCS and also between the antenna and the WCM900. Follow the numbered explanations in order as shown.

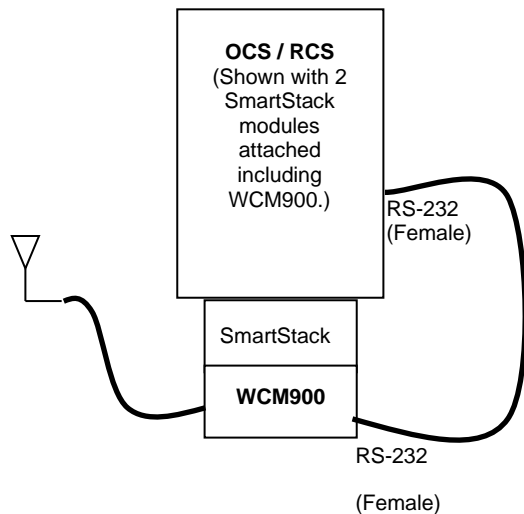
1. When connecting a WCM900 to a PC, power is provided by mounting the WCM900 to a FOX104 base. The FOX104 base functions strictly as a power supply / mounting platform for the WCM900.

In this example, serial data is sent to the WCM900 RS-232 port via a standard RS-232 cable from the PC's RS-232 port. The WCM900 sends out frequency hopping data directly to the antenna or via an external cable connected between the WCM900 and the antenna.



2. The antenna is directly connected to the WCM900 SmartStack Module or can be connected via an external cable to the WCM900.

In this example, the antenna receives frequency-hopping data from another WCM900, which is then sent via cable to the receiving WCM900.



3. Serial data is sent to the OCS/RCS RS-232 port via an external null-modem cable connected to the WCM RS-232 port.

Note: Serial data is not accessed through the backplane of the OCS/RCS that contains the WCM900 in its stack.

Figure 7 – SmartStack WCM900 Overview

4.2 WCM910 Dipswitches / Connectors

a. Dipswitches

Dipswitches on the WCM910 are set by default to use an RS-232 port. If other settings are desired, see the detailed supplement for the WCM910 (MAN0782). Refer to the **Technical Support** section in this document for contact information.

b. Connectors

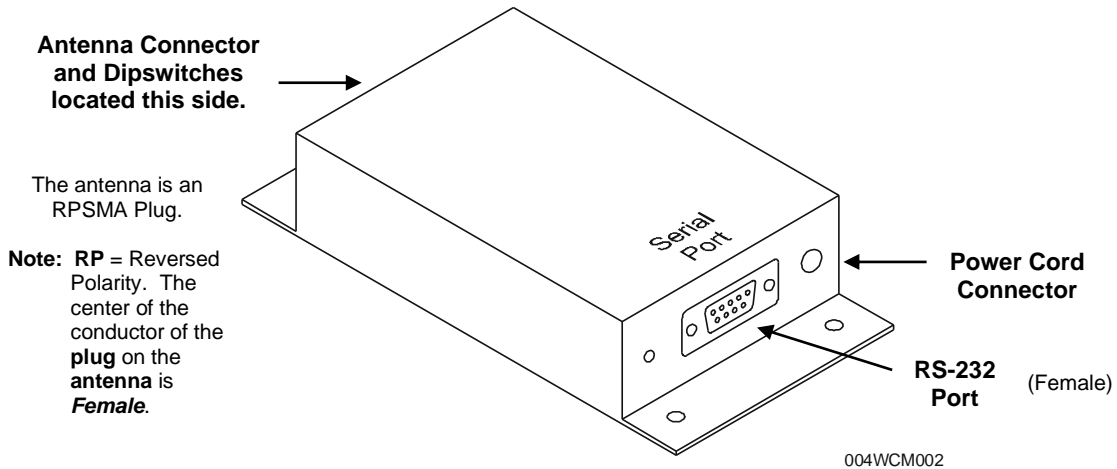


Figure 8 – WCM910 Connectors

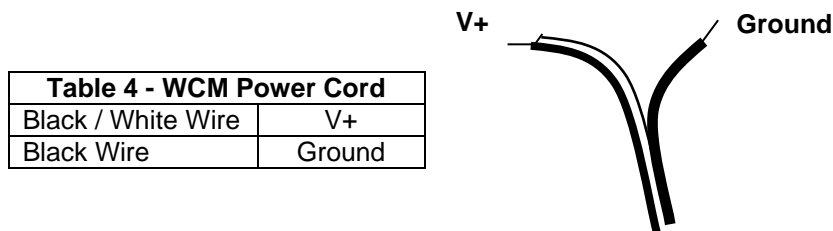


Figure 9 - WCM910 Power Cord

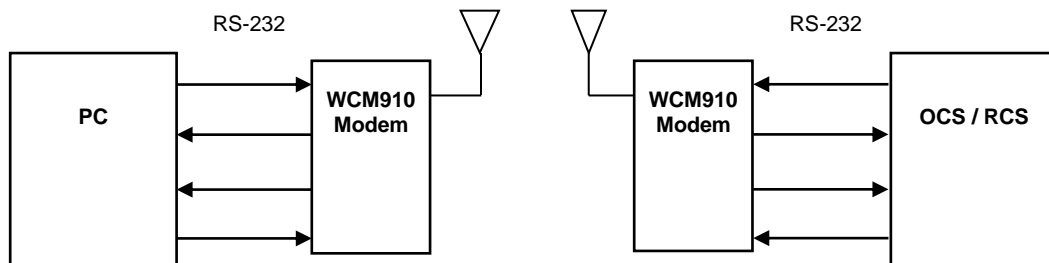


Figure 10 – Stand-Alone WCM910 (Overview)

4.3 Serial Connections

Table 5 shows the serial connection between the WCM and PC.

| Table 5 – WCM900/910 Serial Cable Connections and PC COM RS-232 Serial Port | | | | |
|---|------------------|--------------------|--------|------|
| WCM900/910 Modem DB-9 | Direction | RS-232 Signal Name | PC COM | |
| | | | DB-25 | DB-9 |
| | | PG | 1 | |
| 1 | From MODEM to PC | RLSD/CD | 8 | 1 |
| 2 | From MODEM to PC | RD | 3 | 2 |
| 3 | From PC to MODEM | TD | 2 | 3 |
| 4 | From PC to MODEM | DTR | 20 | 4 |
| 5 | - | SG | 7 | 5 |
| 6 | From MODEM to PC | DSR | 6 | 6 |
| 7 | From PC to MODEM | RTS | 4 | 7 |
| 8 | From MODEM to PC | CTS | 5 | 8 |
| 9 | From MODEM to PC | RI | | 9 |

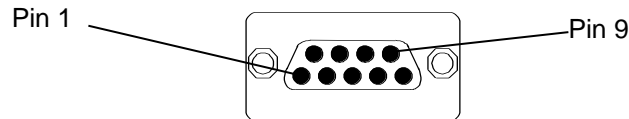


Figure 11 - RS-232 Port on OCS/RCS

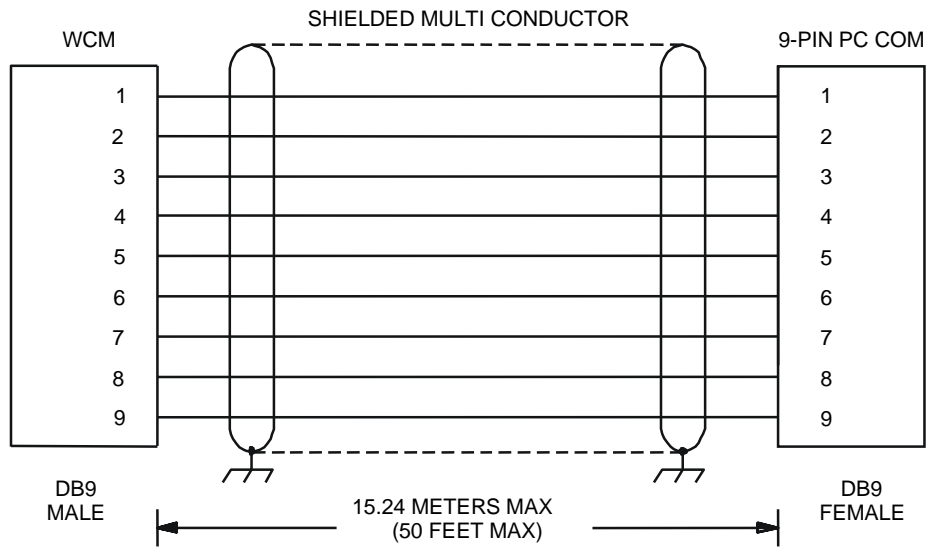


Figure 12 – WCM900 (or WCM910) RS-232 to PC Wiring Diagram (9-pin)

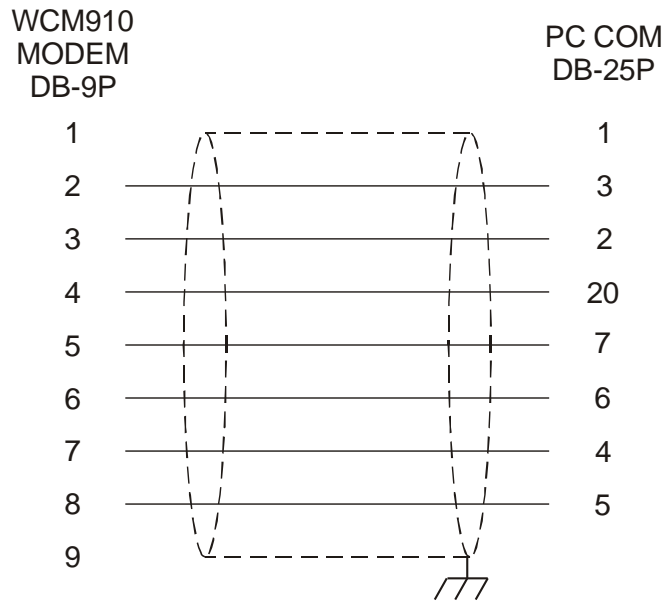
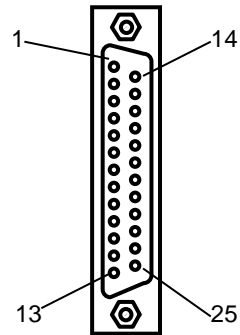


Figure 13 – WCM RS-232 to PC Wiring Diagram (25-pin) (Also Applies to WCM900)

Table 6 shows the serial connection between the WCM and the OCS.

| Table 6 – OCS/RCS RS-232 Serial Port and WCM900/910 Serial Cable Connections | | | | |
|--|----------------------|--------------------------|-------------------|------------------------------|
| Color OCS DB-25P | OCS/ RCS DB-9P | RS-232 Signal Name | Direction | WCM900/910 Modem DB-9P |
| 1 | | PG | | |
| | | RLSD/CD | From MODEM to OCS | 1 |
| 3 | 3 | RD | From MODEM to OCS | 2 |
| 2 | 2 | TD | From OCS to MODEM | 3 |
| | 6 | DTR | From OCS to MODEM | 4 |
| 7 | 5 | SG | - | 5 |
| | 4 | DSR | From MODEM to OCS | 6 |
| 4 | 8 | RTS | From OCS to MODEM | 7 |
| 5 | 7 | CTS | From MODEM to OCS | 8 |
| | | RI | From MODEM to OCS | 9 |



Figure– 14 RS-232 / RS-485 Connector

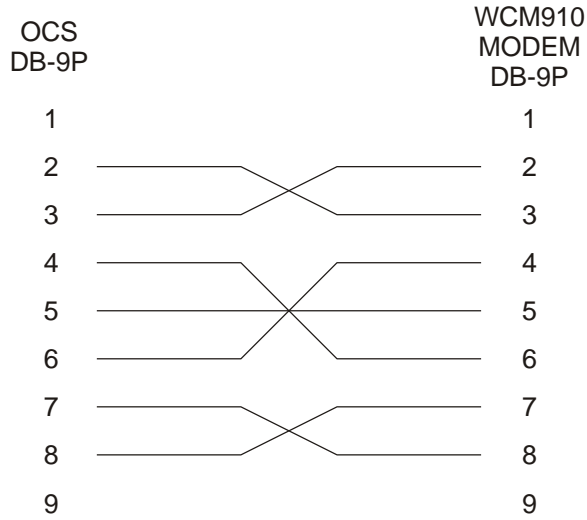


Figure 15 - OCS to WCM RS-232 to Wiring (9-pin) (Also Applies to WCM900)

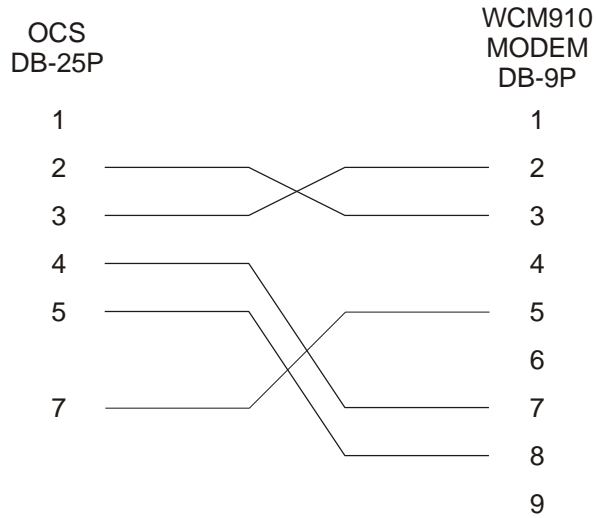


Figure 16 - PC to WCM RS-232 to Wiring (25-pin) (Also Applies to WCM900)

5 CONFIGURATION

Note: The stand-alone WCM910 and the SmartStack WCM900 are not compatible – they can not be used to communicate with one another.

HE800WCM900/ HE-WCM900 and HE200WCM910

Configuration Using RadioSet Software

- RadioSet software is included with both WCM900 (SmartStack) and WCM910 (Stand-Alone) units to set communication parameters.
- Default settings for the WCMs: Baud Rate is set at 9600 and Parity 8-Bit for serial connection.
- For **application-specific configurations**, refer to the following supplements containing **AT Commands:** WCM910 (MAN0782) and WCM900 (MAN0789). See the **Technical Support** section in this document for contact information to obtain manual updates and other assistance.

Additional Configuration for WCM900 / (SmartStack) Using Cscape Software

Configuration using Cscape software is required for the WCM900 to reside in the OCS/RCS/FOX I/O stack.

Note: The WCM900 occupies one of the available four slots.

- Preliminary configuration procedures that apply to all SmartStack™ Modules are contained in the hardware manual of the controller you are using. Refer to the **Additional References** section in this data sheet for a listing of hardware manuals and other useful references. Also, refer to the Cscape Help File.

6 INSTALLATION / SAFETY

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

Use the following wire type or equivalent:

- Belden 8917
- 16 AWG or larger

For detailed installation and a [handy checklist](#) that covers panel box layout requirements and minimum clearances, refer to the hardware manual of the controller you are using. (See the [Additional References](#) section in this document.).

When found on the product, the following symbols specify:



Warning: Consult user documentation.



Warning: Electrical Shock Hazard.

WARNING: To avoid the risk of electric shock or burns, always connect the safety (or earth) ground before making any other connections.

WARNING: To reduce the risk of fire, electrical shock, or physical injury it is strongly recommended to fuse the voltage measurement inputs. Be sure to locate fuses as close to the source as possible.

WARNING: Replace fuse with the same type and rating to provide protection against risk of fire and shock hazards.

WARNING: In the event of repeated failure, do not replace the fuse again as a repeated failure indicates a defective condition that will not clear by replacing the fuse.

WARNING: Only qualified electrical personnel familiar with the construction and operation of this equipment and the hazards involved should install, adjust, operate, or service this equipment. Read and understand this manual and other applicable manuals in their entirety before proceeding. Failure to observe this precaution could result in severe bodily injury or loss of life.

For detailed installation and a handy checklist that covers panel box layout requirements and minimum clearances, refer to the hardware manual of the controller you are using. (See the [Additional References](#) section in this document.):

- All applicable codes and standards need to be followed in the installation of this product.
- For I/O wiring (discrete), use the following wire type or equivalent: Belden 9918, 18 AWG or larger.

Adhere to the following safety precautions whenever any type of connection is made to the module.

- Connect the green safety (earth) ground first before making any other connections.
- When connecting to electric circuits or pulse-initiating equipment, open their related breakers. Do not make connections to live power lines.
- Make connections to the module first; then connect to the circuit to be monitored.
- Route power wires in a safe manner in accordance with good practice and local codes.
- Wear proper personal protective equipment including safety glasses and insulated gloves when making connections to power circuits.
- Ensure hands, shoes, and floor are dry before making any connection to a power line.
- Make sure the unit is turned OFF before making connection to terminals. Make sure all circuits are de-energized before making connections.
- Before each use, inspect all cables for breaks or cracks in the insulation. Replace immediately if defective.

7 ADDITIONAL REFERENCES

The following information serves as a *general* listing of Horner controller products and other references of interest and their corresponding manual numbers. Visit our website listed in the [Technical Support](#) section to obtain user documentation and updates.

| Note: This list is <u>not</u> intended for users to determine which products are appropriate for their application; controller products differ in the features that they support. If assistance is required, see the Technical Support section in this document. | |
|--|----------------------|
| Controller | Manual Number |
| XLE Series (e.g., HE-XExxx) | MAN0805 |
| QX Series (e.g., HE-QXxxx) | MAN0798 |
| NX Series (e.g., HE-NXxxx) | MAN0781 |
| LX Series (e.g., LX-xxx; also covers RCS116) | MAN0755 |
| Color Touch OCS (e.g., OCSxxx) | MAN0465 |
| OCS (Operator Control Station) (e.g., OCS1xx / 2xx; Graphic OCS250) | MAN0227 |
| Remote Control Station (e.g., RCS2x0) | |
| MiniOCS (e.g., HE500OCSxxx, HE500RCSxxx) | MAN0305 |
| Other Useful References | |
| CAN Networks | MAN0799 |
| Cscape Programming and Reference | MAN0313 |
| Wiring Accessories and Spare Parts Manual | MAN0347 |
| DeviceNet™ Implementation | SUP0326 |
| Wiring Accessories and Spare Parts Manual | MAN0347 |

8 TECHNICAL SUPPORT

For assistance and manual up-dates, contact Technical Support at the following locations:

North America:

(317) 916-4274

www.heapg.com

Europe:

(+) 353-21-4321-266

www.horner-apg.com

NOTES