

CRYPTAG[®] CENSUS[®]

PTT2 TEST TAG MANUAL

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Patents in the UK and other countries protect Cryptag systems.

Registered Designs

Various aspects of the Reader design are registered.

WARNING NOTICE

This product uses radio frequency signals to identify tags, and is therefore subject to possible interference. Any application should bear this in mind, and in particular it should not be possible for personal safety to be jeopardised by a failure to read.

Cryptag Census neither uses nor generates hazardous voltages. You should not connect any such voltage to the equipment.

The PTT2 Test Tag is used to monitor correct operation of a reader. It will only do so if it is properly installed in accordance with this manual.



This product complies with the following European Community directives:

Low voltage directive (73/23/EEC)

EMC Directive (89/336/EEC)

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1. Introduction

The Performance Test Tag (PTT2) is used in those situations where the continued operation of the Reader is essential and has to be monitored at all times. Its purpose is to raise an alarm should the Reader, for whatever reason fail to operate. Its secondary purpose is to monitor the reading range and raise an alarm should the reading range be reduced.

The PTT2 monitors the Reader's operation, but it must be understood that this does not provide a complete guarantee that every tag will be read on every occasion. When doing a safety analysis, customers should be aware that:

- *Tags may fail, although the normal failure rate is believed to be less than 0.1% per annum.*
- *Tags have a specified battery life (which varies dependent upon the type of tag used and the way it's used). Cryptag Census tags have a battery low indicator, which should be used to ensure tags don't die unexpectedly.*

Whereas the PTT1 is located within the radio field of the Reader, and communicates with the Reader using radio frequency communications, the PTT2 is wired into the aerial leads of the Reader. The PTT2 monitors the voltage and current in the aerial leads, and it also injects its own output into the aerial leads. The main advantage of the PTT2 is that installation is simpler, as the PTT2 can be placed anywhere in the aerial leads.

The Reader periodically checks for the presence of the PTT2. Should the data exchange between Reader and PTT2 fail, a relay on the PTT2 will operate. Some possible faults are detected by the reader, which operates its own relay.

PTT2 cannot be used with ECx, ELCx, CR1 using internal aerial or CR1-DS1 Reader types which have separate receiver pods.

If the system uses CR1A readers, PTT2A should be used and all references in this manual to PTT2 should be replaced by PTT2A.

One PTT2 is required for each aerial on the system.

2. Installation

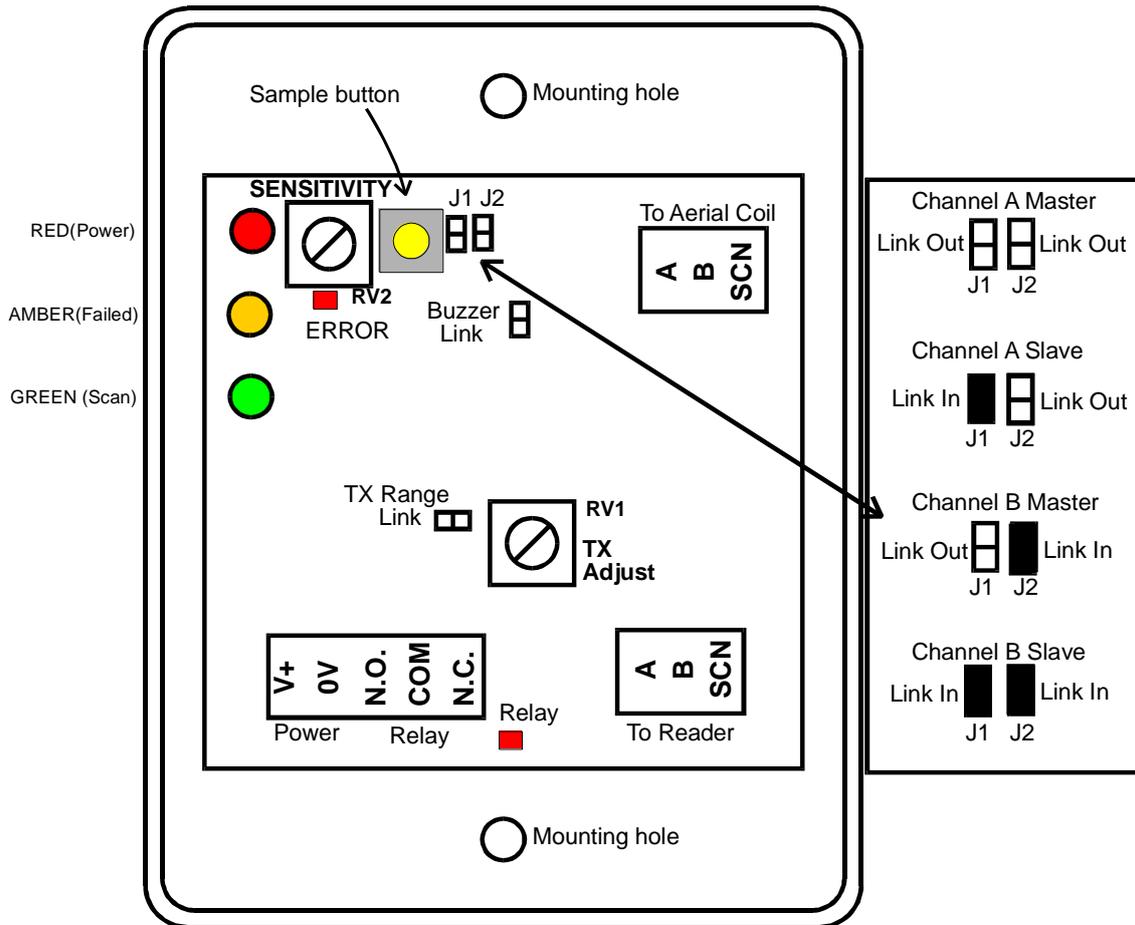
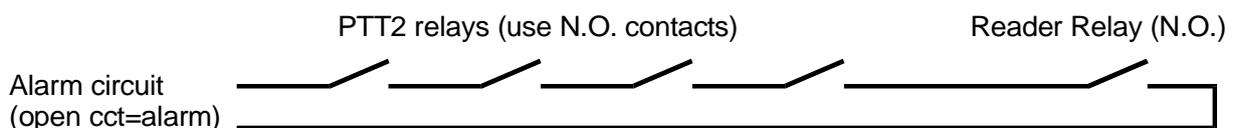


Figure 1

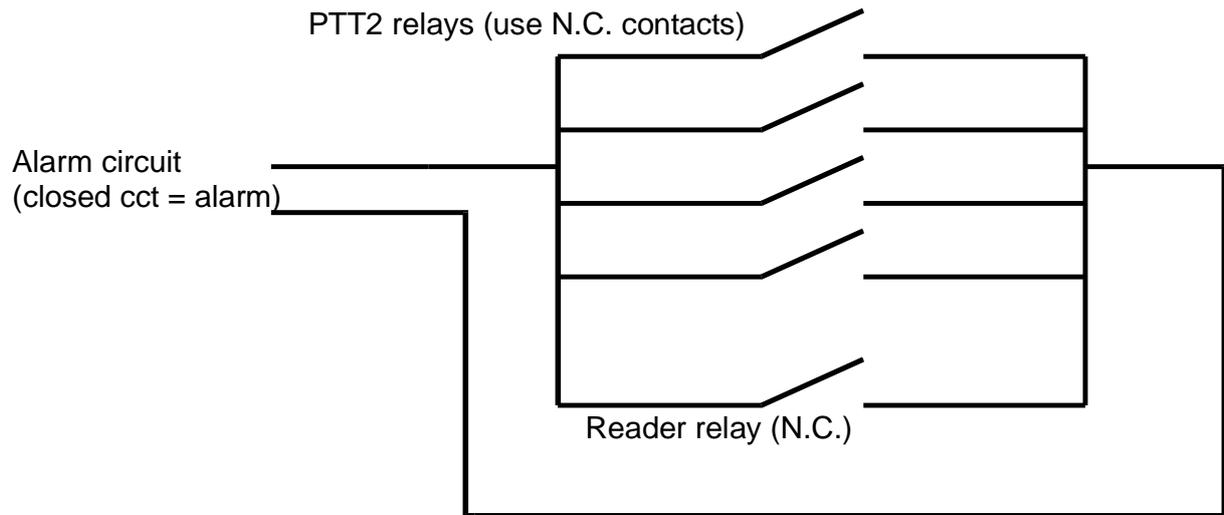
Each aerial requires its own PTT2, which should be connected between Reader and aerial. As the communication is through the aerial leads there is no need to maintain physical separation between PTT2 units. Check also that you have the correct software version in the Reader. (See Appendix A.)

Run and connect a power cable to the PTT2. The power supply for the PTT2 should be separate from the Reader's supply. The same supply could be used as long as the relay's N.O. output is used, so that a warning is given when the power fails. The power supply for the PTT2 should be rated at 100mA. Although the PTT2 can take power supply voltages in the range 7V to 26V, voltages above 14V are not recommended – the PTT2 will dissipate more heat and may therefore be less reliable.

Failures may be detected by either the PTT2 or by the reader, each operating volt free change over relay contact. The relays should be wired so that operation of any relay (PTT2 or reader) will give an alarm. The relays can be wired either in series or parallel, as long as the correct contacts are used to give an alarm if one relay operates. Wiring the relays in series has the advantage that it will also give an alarm if there is a wiring problem - this is the recommended method.



(a) Series connected, using normally open contacts that close in correct operation



(b) Parallel connected, using normally closed contacts that open in correct operation

Figure 2. Wiring the relays

3. Commissioning

3.1 SELECT READER AERIAL CONFIGURATION LINKS (refer to figure 1)

Set the PTT2 aerial configuration links (J1, J2) as follows: -

Reader Type	Selected Aerial	PTT2 J1 & J2 Link selection (See figure 1)
CR1 (external aerial only)	Aerial A	Channel A Master
CR1-MS	Aerial A Master Aerial A Slave	Channel A Master Channel A Slave
CR-DS	Aerial A Aerial B	Channel A Master Channel B Master
CR1-DS-MS	Aerial A Master Aerial A Slave Aerial B Master Aerial B Slave	Channel A Master Channel A Slave Channel B Master Channel B Slave

For other reader variants, contact Identec Limited

3.2 POTENTIOMETERS

Ensure that the SENSITIVITY pot (may be marked SENSE) is fully clockwise, and the TX Range pot is fully clockwise. The TX Range link should be out.

3.3 POWER UP THE RELEVANT READER

On power up the LED1 on the processor board of the Reader should complete an OFF-ON-OFF cycle lasting 1 second.

3.3.1 Test the operation of the aerial to be monitored. Present a valid tag into the detection field of the Reader. Ensure the Amber LED on the terminal board flashes at the desired reading range. If the range is incorrect, refer to the appropriate Reader manual for range optimisation.

3.3.2 If the amber LED is flashing while a tag is held at the extremities of range, then all is well with this Reader, proceed with PTT2 commissioning. All adjustments to the Reader's range must be made at this stage.

3.3.3 Leave the Reader connected and operating.

3.4 POWER UP THE PTT2

Connect the power supply to +V & 0V on TB1 (see figure 1). The PSU must be capable of supplying 7V–26V DC at 100mA.

3.4.1 Switch on the power and ensure the Red power LED illuminates (LED 1). The buzzer will sound.

3.4.2 Press the Sample button, and observe the small red ERROR LED beside the Sample button. If this LED flashes it means that the aerial is not properly tuned. This must be corrected before proceeding. Pressing the Sample button allows the PTT2 to measure the expected voltage and current for this aerial. All subsequent tests are made against these sampled values.

- 3.4.3 Immediately after the Sample button is pressed the amber (FAIL) LED will flash, then the green (SCAN) LED should flash. When the green LED starts flashing the buzzer should go off. You may wish to disable the buzzer by removing the buzzer link.
- 3.5 SETTING UP PTT2 TRANSMITTER POWER
- 3.5.1 You should have already checked that tags are being read at the desired range.
- 3.5.2 Slowly adjust the TX (PTT2) potentiometer, turning it anti-clockwise, until the green LED goes off and the amber LED starts to flash. If the green LED is still flashing when the potentiometer is fully anti-clockwise, insert the TX Range link, move the TX Range potentiometer to fully clockwise, and start again.
- 3.5.3 If the TX Range link is in place, do not turn the TX range potentiometer below half way. If the PTT2's TX power is too low, it may be too susceptible to noise levels that would not affect normal tag reading.
- 3.5.4 Move the TX potentiometer, turning it clockwise by about 30 degrees to extinguish the amber and cause the Green LED to blink regularly.
- 3.7 CHANGING THE SENSITIVITY OF THE PTT2 RECEIVER
- The PTT2 can be made less sensitive using the SENSITIVITY potentiometer. This should not normally be necessary, but it might be useful where it is known that conditions will vary. For example if heavy vehicles might park alongside the aerial the coil would be detuned leading to an increase in current and a drop in voltage. These might be sufficient to cause the PTT2 to signal a fault.
- 3.7.1 Only adjust the SENSITIVITY potentiometer away from fully clockwise if it is necessary to avoid false alarms.
- 3.7.2 It is best to adjust the sensitivity with a situation worse than you expect to see in practice, such as with a vehicle closer than might normally occur. Even then it may not be necessary to desensitise the PTT2.
- 3.7.3 Slowly adjust the SENSITIVITY potentiometer, turning it anti-clockwise, until the green LED comes on.
- Note that with the SENSITIVITY potentiometer near to fully anti-clockwise the PTT2 will not detect many faults. This position should only be used if absolutely necessary.
- 3.8 PTT2 RELAY
- 3.8.1 With the green LED blinking regularly, check that the red RELAY LED is on, the COM and NO contacts of the relay are connected, and the COM and NC contacts are not connected.
- 3.8.2 Remove the power from the Reader and ensure the RELAY LED goes out, and the contacts COM and NO on the relay go open circuit. If the buzzer link is in, the buzzer will start to sound when the RELAY LED goes out.
- 3.8.3 Check that an alarm has occurred.
- 3.8.4 Reconnect power to the Reader and ensure the green LED on the PTT2 is blinking.
- 3.8.5 Check that the alarm has cleared.
- 3.9 READER RELAY
- 3.9.1 Power down one PTT2 and check that the relay on the reader goes open circuit. (This should also cause an alarm.) Reconnect the power to the PTT2.
- 3.9.2 Repeat 3.9.1 for each PTT2 connected to the reader.
- 3.9.3 Remove one lead from the reader relay and check that an alarm occurs. Reconnect.
- 3.9.4 Fit the lid on to each PTT2 using screws and plastic covers provided.

The system is now correctly set up and functioning

- 3.10 If buzzer operation is required, replace the buzzer link.

4. LED indications

Main LEDs (visible from outside)

Red (POWER) Power on
Should always be on

Amber (FAIL) Flashes when PTT2 is getting communications from the reader, but goes out once two way communication is established.

If both green and amber LEDs are off (and power is on) the PTT2 is not getting transmission signals from the reader. Check the connections.

Green (SCAN) Flashes when two way communications are established. Normally the flashing has a 1:1 mark/space ratio, but this switches to 1:7 if the reader has stopped sending test messages (as it is allocating more time to reading tags).

Red (ERROR) Normally off.
Comes on when the aerial voltage/current shows an error.

Mark/space ratio	Cause
1:3 (25%)	Current low (disconnected coil)
1:1 (50%)	Voltage low (detuned or range turned down), or No signal from reader (wires not connected or shorted)
3:1 (75%)	Current high (detuned)
always on	Supply voltage low

NB:

Sometimes the PTT2 might detect more than one fault, so for instance a shorted coil might give either "Current high" or "Voltage Low".

It might be possible for the ERROR LED to be off when neither the Amber or Green LEDs is flashing, if the reader aerial connections are not made or shorted.

Red (RELAY) on when relay is on (PTT2 operating normally)

Buzzer Comes on when the relay is off. This may not occur at exactly the same time as the green LED starts flashing.

Appendix A. Software versions

The basic means of testing that the reader is operating correctly relies on special test messages which are addressed to an individual PTT2. Although this is normally fine, it can give rise to false alarms if the reader is having to deal with a large number of tags, particularly on direction sensing readers.

To cope with this Identec have produced a version of the PTT2 software that will not go into alarm if the reader still appears to be reading tags correctly. To ensure the reader is still working it occasionally responds like a normal tag and checks that the reader reacts correctly. To show that the PTT2 is operating in this “reduced” mode it changes the duty cycle on the LEDs. The LED colours remain the same but they now flash for a shorter time (1 to 7 rather than 1 to 1).

To aid with the setting up procedure, test messages are available on the Reader serial port. The test mode is initiated by taking “RED IN” on the terminal board to 0V. Refer to Reader software specification for further details.

Appendix B Failure modes and detection

PTT2 monitors the aerial leads to ensure that the reader is operating correctly. This is less visible than PTT1 which communicates using magnetic fields. This Appendix is provided to explain how PTT2 operates and how it detects faults.

PTT2 looks at the voltage across the aerial coil when the reader is transmitting to tags. This voltage is sampled during installation and stored in non-volatile memory. If the voltage drops below a certain percentage of the sampled voltage, the PTT2 ignores incoming messages which means that both it and the reader will trigger an alarm. The threshold is set at about 85% of voltage for the SENSITIVITY pot fully clockwise. With the SENSITIVITY potentiometer fully anti-clockwise the threshold is set to zero and no alarm will be raised for reduced voltage.
(85% typically corresponds to about 5% loss of range from the reader to the tag.)

The PTT2 also monitors the current in the coil, and tests to see that this is neither too high nor too low. If the aerial coil were to become disconnected from the reader the current will drop, giving an alarm. This is not affected by the SENSITIVITY potentiometer.

If the coil were to become detuned the current in the coil will rise, and this will also cause the voltage to start to drop. Although excessive current will not in itself affect reading performance it is symptomatic of an error that should be corrected. The threshold level starts at twice the sampled current.

PTT2 transmits to the reader by injecting a voltage into the aerial lead. As the other tests have ensured the aerial coil's integrity, this signal is equivalent to what a tag would produce.

The power supply to the PTT2 is monitored and an error occurs if the internal 5V supply drops below about 4V, as this would mean that the measurements could also be in error.

Appendix C Quick setup procedure

1. Connect PTT2 to 12 Volts (range 7 to 26 volts). The buzzer will come on. (The buzzer can be disabled by removing the buzzer link.)
2. Break into Reader to Aerial cable and connect PTT2. See figure 2
3. Set J1 & J2 links (refer to figure 1).
4. Set RV1 (TX Adjust) fully anticlockwise and RV2 (SENSITIVITY) fully clockwise.
5. Power up reader
6. After 10 seconds, press the “set-up” button for 3 seconds and release.
7. The amber LED should now be flashing
8. Turn the TX Adjust pot (RV1) slowly clockwise until the Amber light first goes out and the Green LED comes on.
9. Continue turning pot RV1 a further 1/8 turn (threshold)
10. Green LED should be blinking. The RELAY LED should be on. The buzzer should have stopped sounding.
11. Connect relays as stated in Installation section.

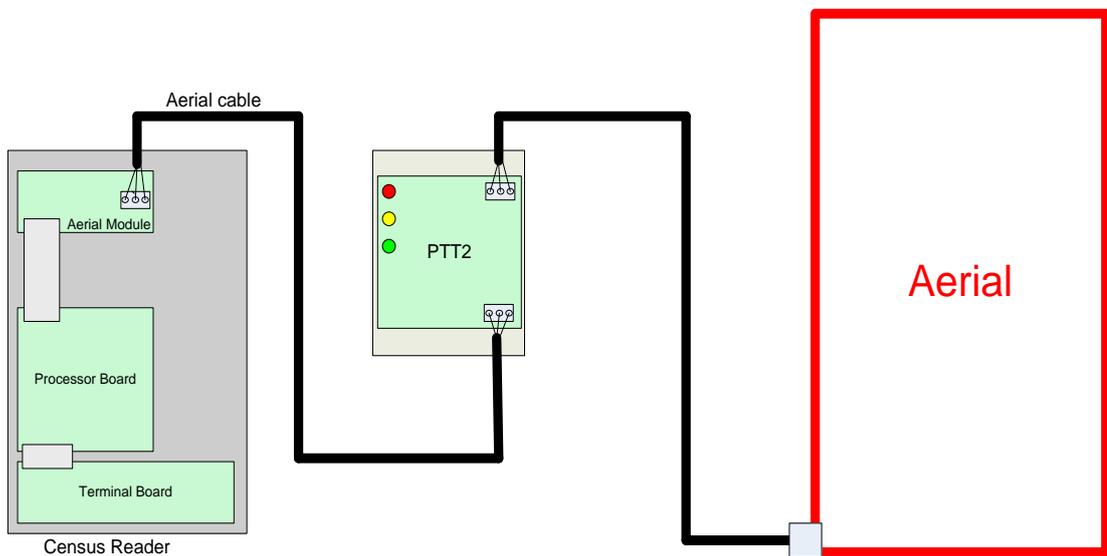


Figure 3