Escea Controller Network Communications Summary 16/03/2016

Author: Mark Butler, Tussock Innovation

Hardware

MicroChip ENC28J60 Ethernet 10mbit

- MAC Address set to private address range: AC:DE:48:XX:XX:XX
- Final 3 bytes of MAC address come from the RF remote control address (derived from fire serial number.

Network Stack

Ethernet

IP, ICMP, ARP

TCP, UDP

DHCP (client), HTTP Server, NBNS/WINS, MDNS

Network Monitor, Smartphone Comms, Smart Heat Client

Incoming (Listening) Interfaces

- DHCP Client UDP **Port 68**
- NBNS UDP **Port 137**
- MDNS UDP **Port 5353**
- Smartphone Coms UDP **Port 3300**
- HTTP Server TCP **Port 80**

Outgoing Interfaces

- Smart Heat TCP Source Port 29152 - 29202 Dest Port 8001
- NBNS UDP Multicast port 137
- DHCP Client UDP broadcast port 67

DHCP Client

The DHCP client is start on establishment of an ethernet connection. It makes 5 attempts to obtain a DHCP lease (IP address), each with a 10 second time out. If a lease has not been obtained after 5 attempts, it falls back to a static IP address. Every 2 minutes after that, a single attempt is made to obtain a lease. When a lease is successful obtained, the other applications in the network stack are started. 20s prior to the lease expiry, the DHCP client will attempt to re-lease the IP address.

ICMP
This network stack will respond to ping requests. It is also capable of making them - this is used by the network monitor application.

MDNS
Multicast DNS is used to allow mac users to access the web interface of the fire. It responds to requests for the name “escea-<serialnumber>.local” e.g.” ecea-66051.local”. This service is broadcast when the network stack is initialised, then rebroadcast every 60s after that.

NBNS
NBNS or WINS is used to allow Windows users to access the web interface. It responds to requests for ESCEA-<serial> e.g ESCEA-66051

Network Monitor
The network monitor pings the gateway (generally the router) every 50s to check that network connection is still active. If it does not get a response within 5s the network stack is reset.
NOTE: Ensure that the gateway is set to respond to internal pings.

Smart Phone Comms
This application listens for queries from the smartphone app over a local network. It is a stateless UDP based protocol that only responds to requests from the app.

Smart Heat
This application connects to the smart heat server via an outgoing TCP connection. This creates a pipe between the fire and the smart heat server, allowing the server to send commands through at any time. To maintain the connection, the server pings the fire every 2 minutes. If a ping is not received after 135s, the TCP connection is closed, and a new connection is opened on a different port. If connection fails, a new connection attempt is made every 20s. The smart heat app is not started if there is no gateway present after DHCP leasing is completed.

Escea Ltd
17 Carnforth St
Green Island
Dunedin, 9018
New Zealand
Ph: +64 3 478 8220
Fax: +64 3 478 8221
info@escea.coom
www.escea.com

P.O. Box 5277
Dunedin, 9058
New Zealand