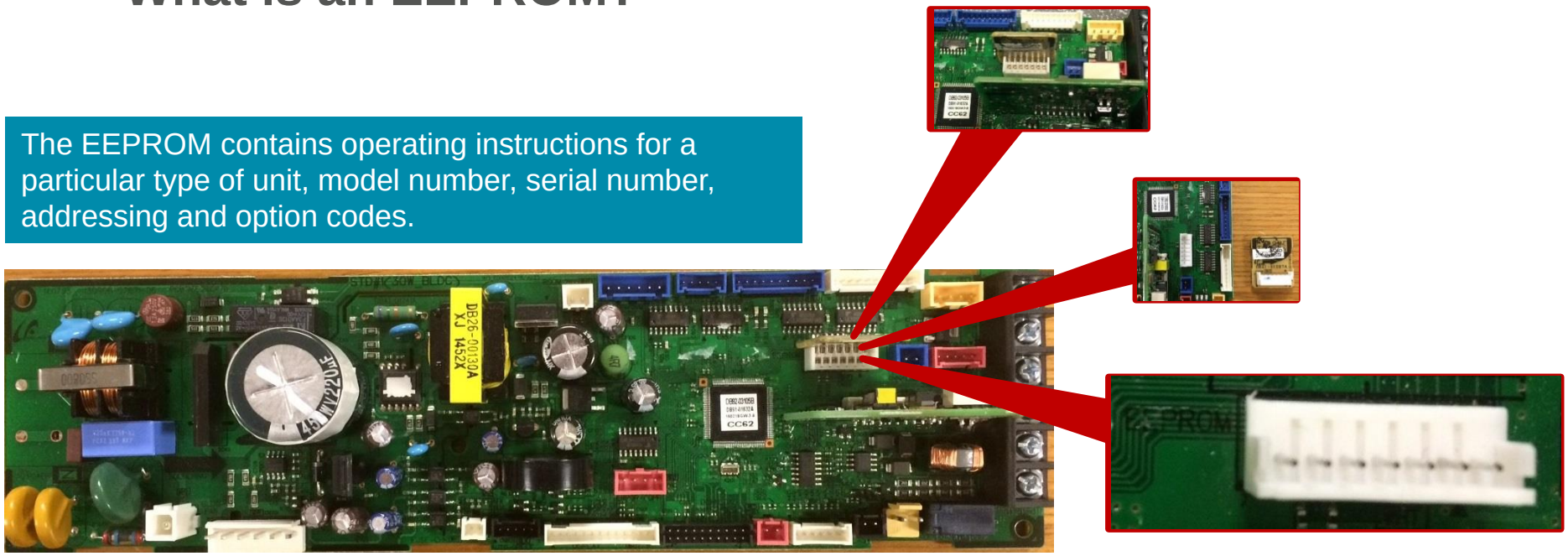
Blank EEPROM's

Bringing an indoor unit to life

John Willis

What is an EEPROM?

The EEPROM contains operating instructions for a particular type of unit, model number, serial number, addressing and option codes.



Function	No. of digits to set (Logical [physical])	Code structure (Logical)
Indoor unit Product Code setting (Digit 2=1)	24 [20]	01xxxx-1xxxxx-2xxxxx-3xxxxx
Install option setting1 (Digit 2=2)	24 [19]	02xxxx-1xxxxx-2xxxxx-3xxxxx
Install option setting2 (Digit 2=5)	24 [19]	05xxxx-1xxxxx-2xxxxx-3xxxxx

What is an EEPROM?

- Think of it like a boot device for a computer but, it is for an indoor unit.
  - Boot from a CD drive
  - Boot from the C:\ drive
  - Boot from a USB
    - An EEPROM is very similar to a USB device in that it holds the information required for the IDU to boot properly.
- What happens when the boot device for your computer is corrupt or missing?
  - “Blue Screen of Death”
    - Run chkdsk, repair, boot from another drive
  - Essentially this is the same thing when an EEPROM is missing, blank, corrupted, etc.
- All units have an EEPROM.

Potential Causes of an EEPROM Issue

- Replaced main board
  - Returned “bad” EEPROM with “bad” board to parts
    - Never return EEPROM to parts, keep and install in new board.
  - Highwall unit
    - **THE HIGHWALL DOES NOT HAVE A REMOVABLE EEPROM**
    - When you replace the board you replace the EEPROM
- Truly a bad EEPROM
- Something has happened during flashing of EEPROM
  - Lost power, hibernate, computer battery dies, etc. during download of option codes or EEPROM flash.
  - Inadvertently write the wrong the Product Option code (digit 2 = 1) or Product Option Code is blank.
- Other reasons yet to be discovered

Symptoms

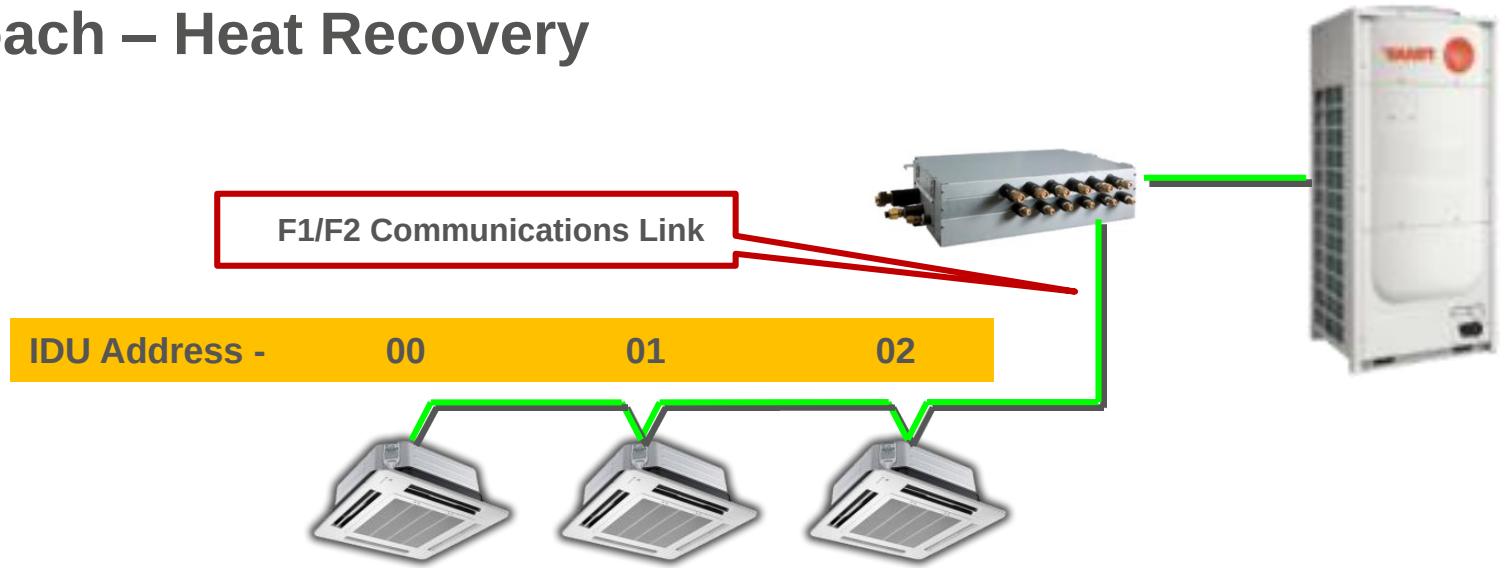
- Unit(s) are not populating data in Tech Utility Tool (TUT) for some number of indoor units.
  - Once communications error code is present, TUT no longer brings in data.
    - As the ODU tracks the IDU's, it may skip addresses as it counts up (ex., Seven IDU's but only six are found after new board is installed -> AD00, AD01, AD02, AD03, AD04, AD05… -> Flash -> Start over -> 3 min timer expires -> E201 A unit is missing).
    - A 2 minute timer is used to establish communications between the ID and OD units.
      - If it is a small enough system, you may see every other IDU but the one(s) affected.
      - If it is a large system, it may not populate data for several units. Not everyone of these units may be the problem unit(s).
- Units affected do not show up in the Tech Utility Tool
- "System was working before you replaced the main board in IDU #X"

- Communication error codes (E201, E213, E202 and others)
- Wired controller blank.

Approach

- **DO NOT ASSUME! What direction are the facts taking you in?**
  - Look at the overall picture.
    - If this is a new start up and you did not personally verify system set up, there is a 99.9% chance this is not your issue.
      - Get a component location sheet filled out (**HP** – VRF-ADF004A-EN, **HR** – VRF-ADF005A-EN)
      - Set up TUT, verify error codes on ODU
      - Verify wiring, verify MCU addresses and port switches.
    - If this is a board replacement, this could be the information you need.
      - Get a component location sheet filled out (**HP** – VRF-ADF004A-EN, **HR** – VRF-ADF005A-EN)
      - Set up TUT, verify error codes on ODU
      - Push K3

Approach – Heat Recovery



VRF Heat Recovery Installation

JOB NAME Training Example
LOCATION TechTV
DATE Oct 14

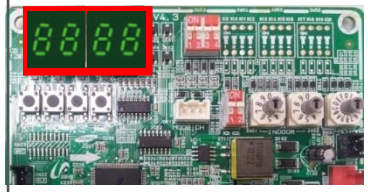
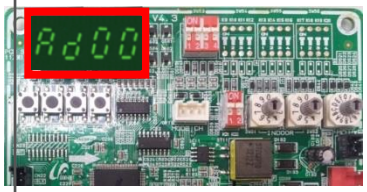
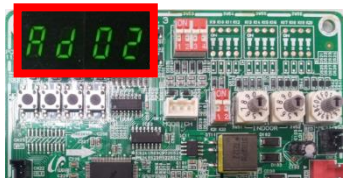
TRANE VRF
Outdoor Unit Set Up

Rotary Switch Set At	SW-51	SW-52
TOTAL INDOOR UNITS	0	3

SWITCH 53	K5	K6	K7	K8
MAIN	On	On	On	On
SUB -A				
SUB B				

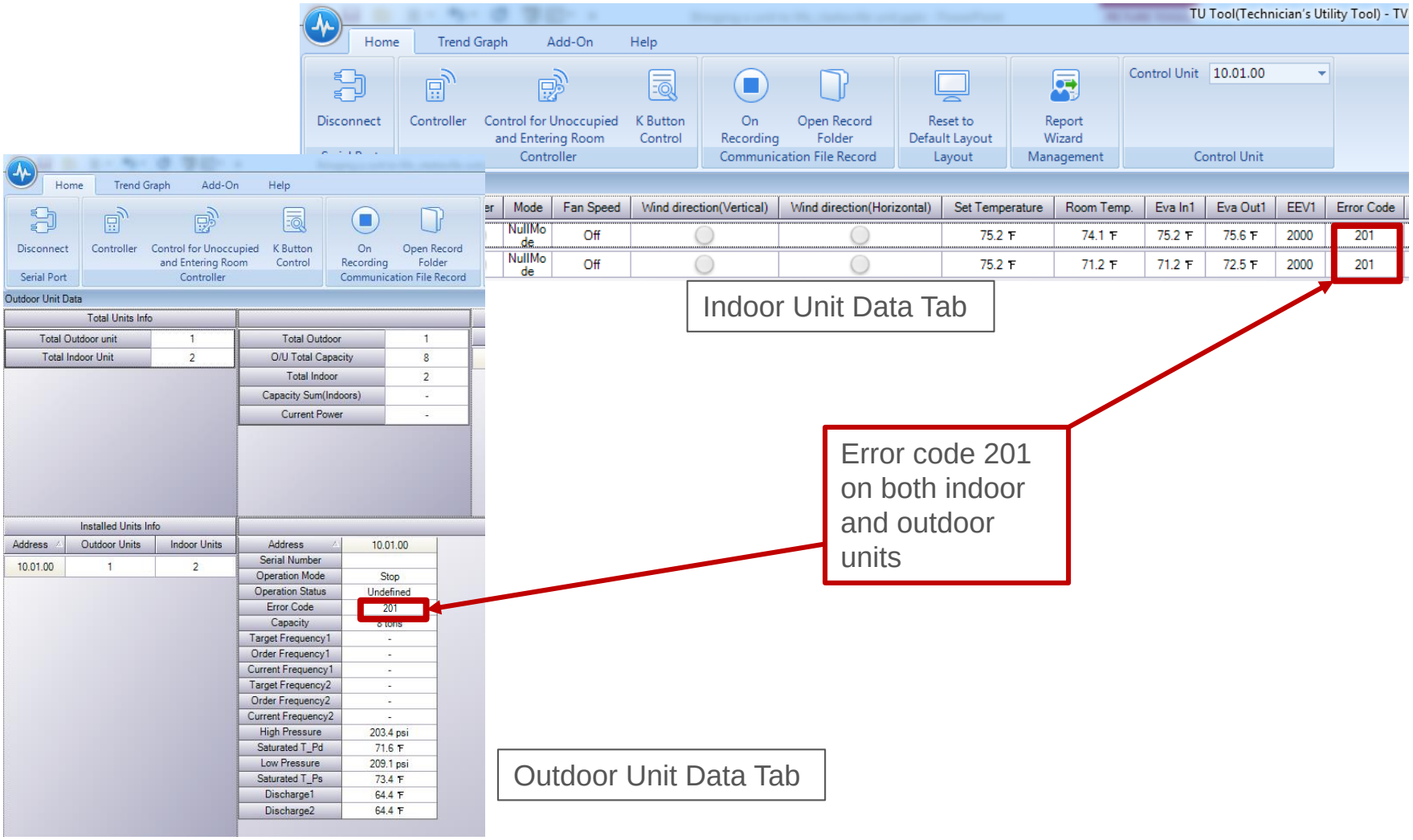
Rotary Switch Set At	SW-57	
TOTAL MCU UNITS	0	1

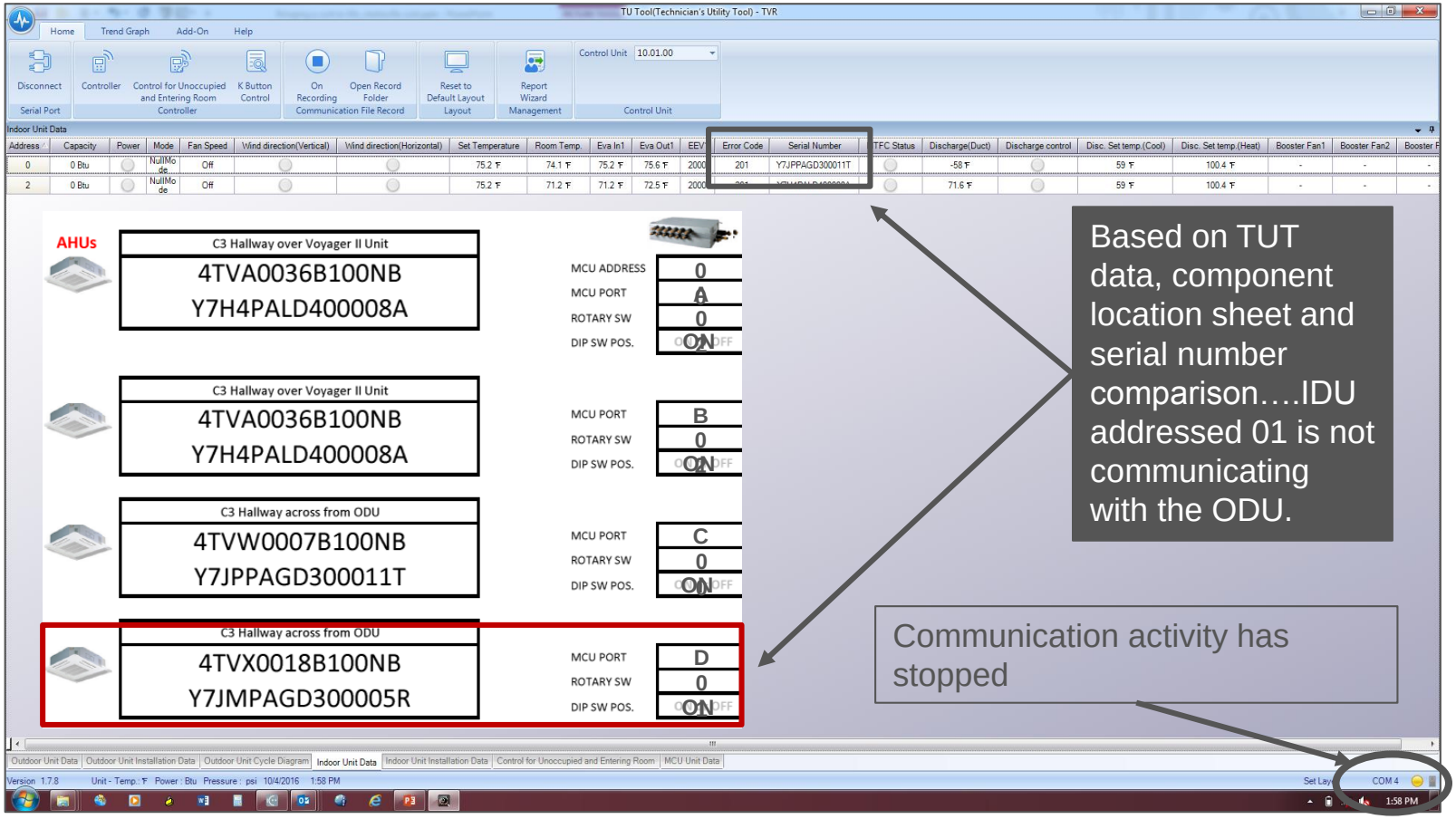
After pressing K3 on the ODU, observe the seven segment display and make note of any indication the ODU is not communicating with the IDU(s).

Sequence	Display	Check point
1		● Check display digit - Quad “8’s” flicker consecutively from left to right - Check whether seven-digit display has any defects (missing segments or digits)
2		● ODU Starts Tracking - “Ad” means ODU is tracking and if not already completed, assigning IDU auto addresses - Right 2 digits show actual number of communicating indoor units. ***If final number is not equal to the number of units dialed into switches 51 and 52, the ODU is not communicating with a unit(s).***
3		● Communication between outdoor and indoor unit - ODU tracking indoor unit address 0 to 63 - If ODU receives response from indoor unit, the unit count displays on the right side ★ 0~63 : Indoor address

Approach

- In less than three minutes, if all indoor units are not found, an E201 → U200 → E201 will display at the ODU seven segment display.
- An E201 will display in TUT for the remaining IDU's and ODU.
- TUT will slow down in its update rate until it quits and the yellow and green light in the bottom right corner of the TUT screen quits blinking and becomes a solid yellow.
- If you are lucky


TU Tool(Technician's Utility Tool) - TV
Home
Trend Graph
Add-On
Help
Disconnect
Controller
Control for Unoccupied and Entering Room
K Button Control
On Recording
Open Record Folder
Reset to Default Layout
Report Wizard
Control Unit
10.01.00
Serial Port
Controller
Communication File Record
Layout
Management
Control Unit
Mode
Fan Speed
Wind direction(Vertical)
Wind direction(Horizontal)
Set Temperature
Room Temp.
Eva In1
Eva Out1
EEV1
Error Code
NullMode
Off
75.2 ℉
74.1 ℉
71.2 ℉
72.5 ℉
2000
201
Indoor Unit Data Tab
Outdoor Unit Data
Total Units Info
Total Outdoor unit
Total Indoor Unit
Total Outdoor
O/U Total Capacity
Total Indoor
Capacity Sum(Indoors)
Current Power
Installed Units Info
Address
Outdoor Units
Indoor Units
Serial Number
Operation Mode
Stop
Operation Status
Undefined
Capacity
Target Frequency1
Order Frequency1
Current Frequency1
Target Frequency2
Order Frequency2
Current Frequency2
High Pressure
203.4 psi
Saturated T_Pd
71.6 ℉
Low Pressure
209.1 psi
Saturated T_Ps
73.4 ℉
Discharge1
64.4 ℉
Discharge2
64.4 ℉
Error code 201 on both indoor and outdoor units
Outdoor Unit Data Tab


TU Tool(Technician's Utility Tool) - TVR
Home
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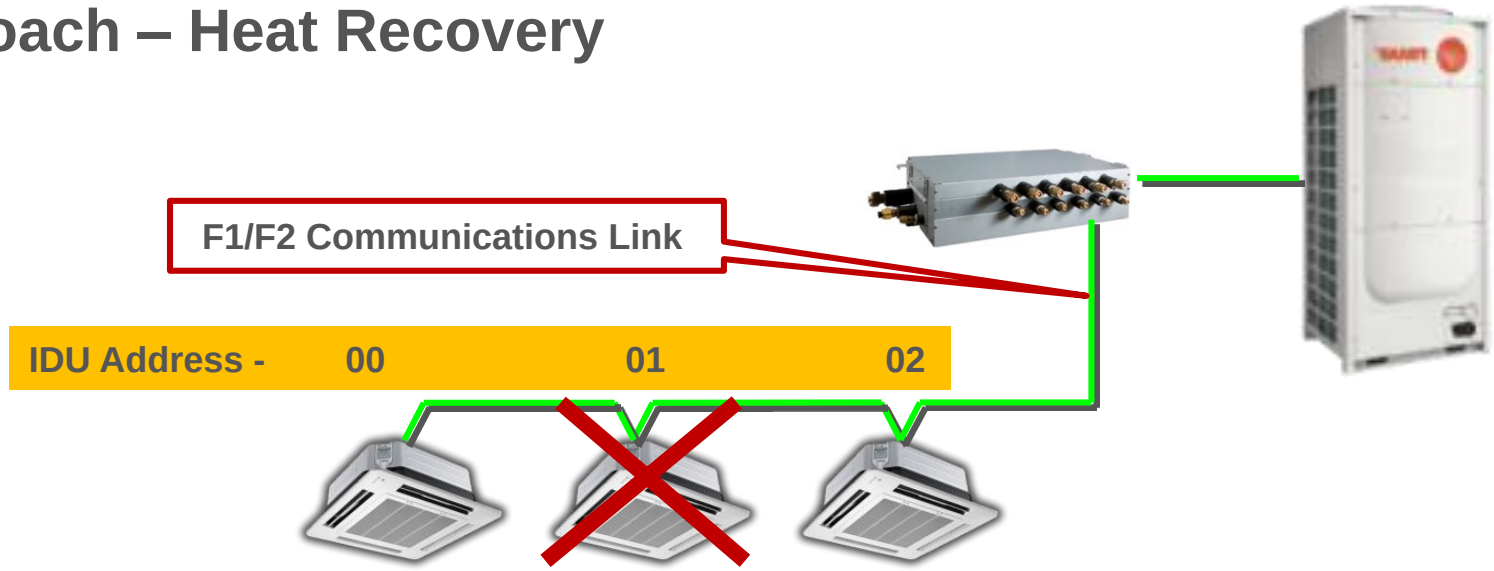
Reset to Default Layout
Layout
Report Wizard Management
Control Unit
10.01.00
Indoor Unit Data
Address
Capacity
Power
Mode
Fan Speed
Wind direction(Vertical)
Wind direction(Horizontal)
Set Temperature
Room Temp.
Eva In1
Eva Out1
EEV
Error Code
Serial Number
TFC Status
Discharge(Duct)
Discharge control
Disc. Set temp.(Cool)
Disc. Set temp.(Heat)
Booster Fan1
Booster Fan2
0 Btu
Off
75.2 ℉
74.1 ℉
75.6 ℉
201
Y7JPPAGD300011T
-58 ℉
59 ℉
100.4 ℉
2
0 Btu
Off
75.2 ℉
71.2 ℉
71.2 ℉
72.5 ℉
71.6 ℉
59 ℉
100.4 ℉
AHUs
C3 Hallway over Voyager II Unit
4TVA0036B100NB
Y7H4PALD400008A
MCU ADDRESS
0
MCU PORT
A
ROTARY SW
0
DIP SW POS.
ON
C3 Hallway over Voyager II Unit
4TVA0036B100NB
Y7H4PALD400008A
MCU PORT
B
ROTARY SW
0
DIP SW POS.
ON
C3 Hallway across from ODU
4TVW0007B100NB
Y7JPPAGD300011T
MCU PORT
C
ROTARY SW
0
DIP SW POS.
ON
C3 Hallway across from ODU
4TVX0018B100NB
Y7JMPAGD300005R
MCU PORT
D
ROTARY SW
0
DIP SW POS.
ON
Outdoor Unit Data
Outdoor Unit Installation Data
Outdoor Unit Cycle Diagram
Indoor Unit Data
Indoor Unit Installation Data
Control for Unoccupied and Entering Room
MCU Unit Data
Version 1.7.8
Unit - Temp.: ℉ Power : Btu Pressure : psi 10/4/2016 1:58 PM
COM 4
1:58 PM
Based on TUT data, component location sheet and serial number comparison….IDU addressed 01 is not communicating with the ODU.
Communication activity has stopped

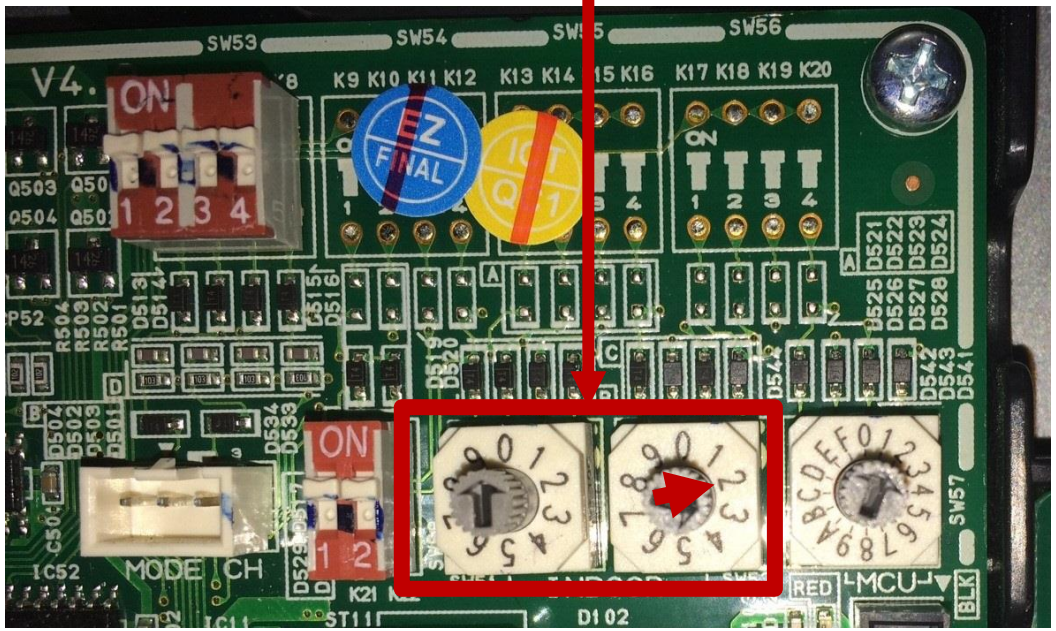
Approach – Heat Recovery



1. Based on the component location sheet and the data that does populate in TUT before the error code trips, it is this IDU serial number that is not communicating.
2. Locating the IDU for visual inspection, the receiver is blank and no lights are illuminated.
3. Verify by
    1. turning power off to the unit(s)
    2. turning off the port at the MCU the serves this IDU
    3. Adjusting the switches (SW51, SW52) at the ODU to reflect the “new” number of IDU’s installed in the system.
4. Does the system run error code free? If so then you have the right unit.

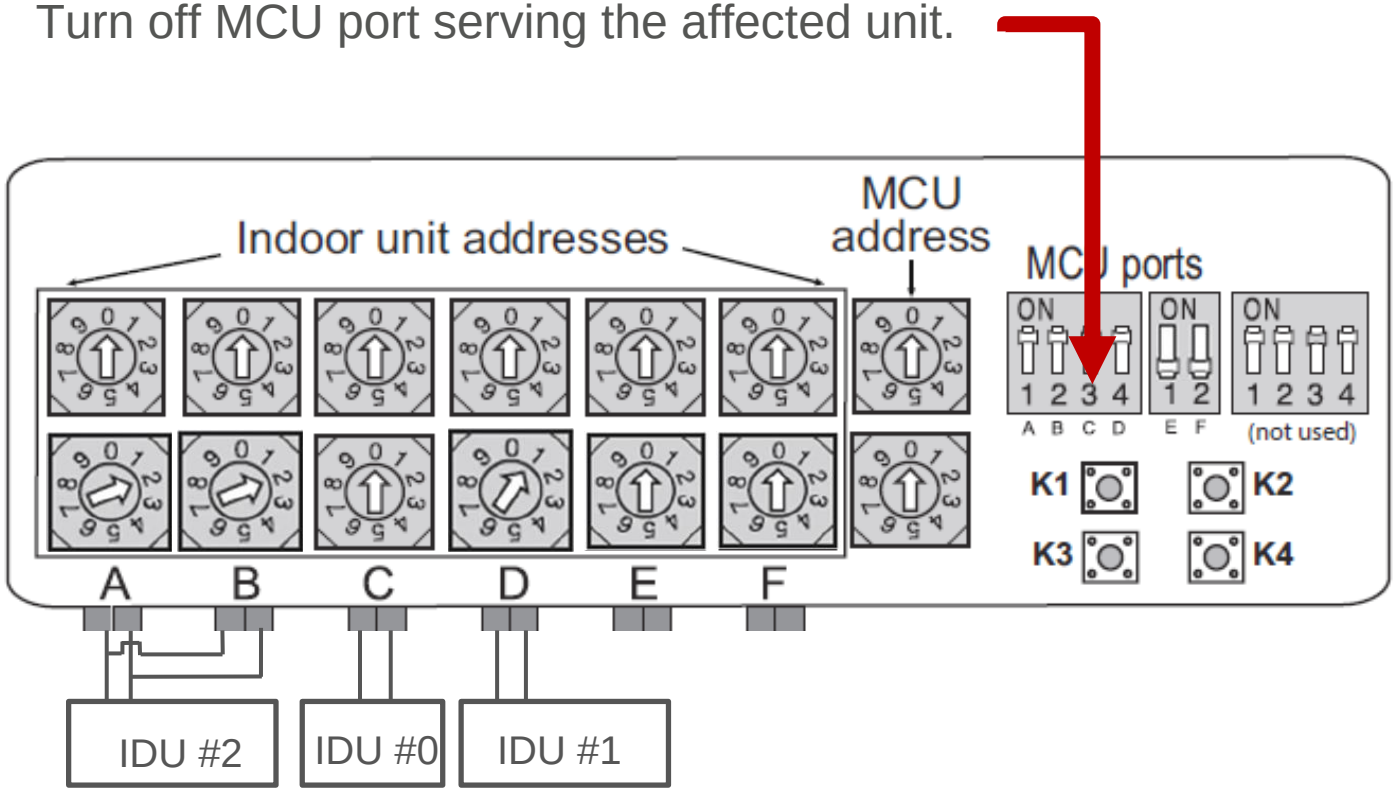
Fix

- Dial back SW51 and SW52 from 03 to 02



Fix

- Turn off MCU port serving the affected unit.



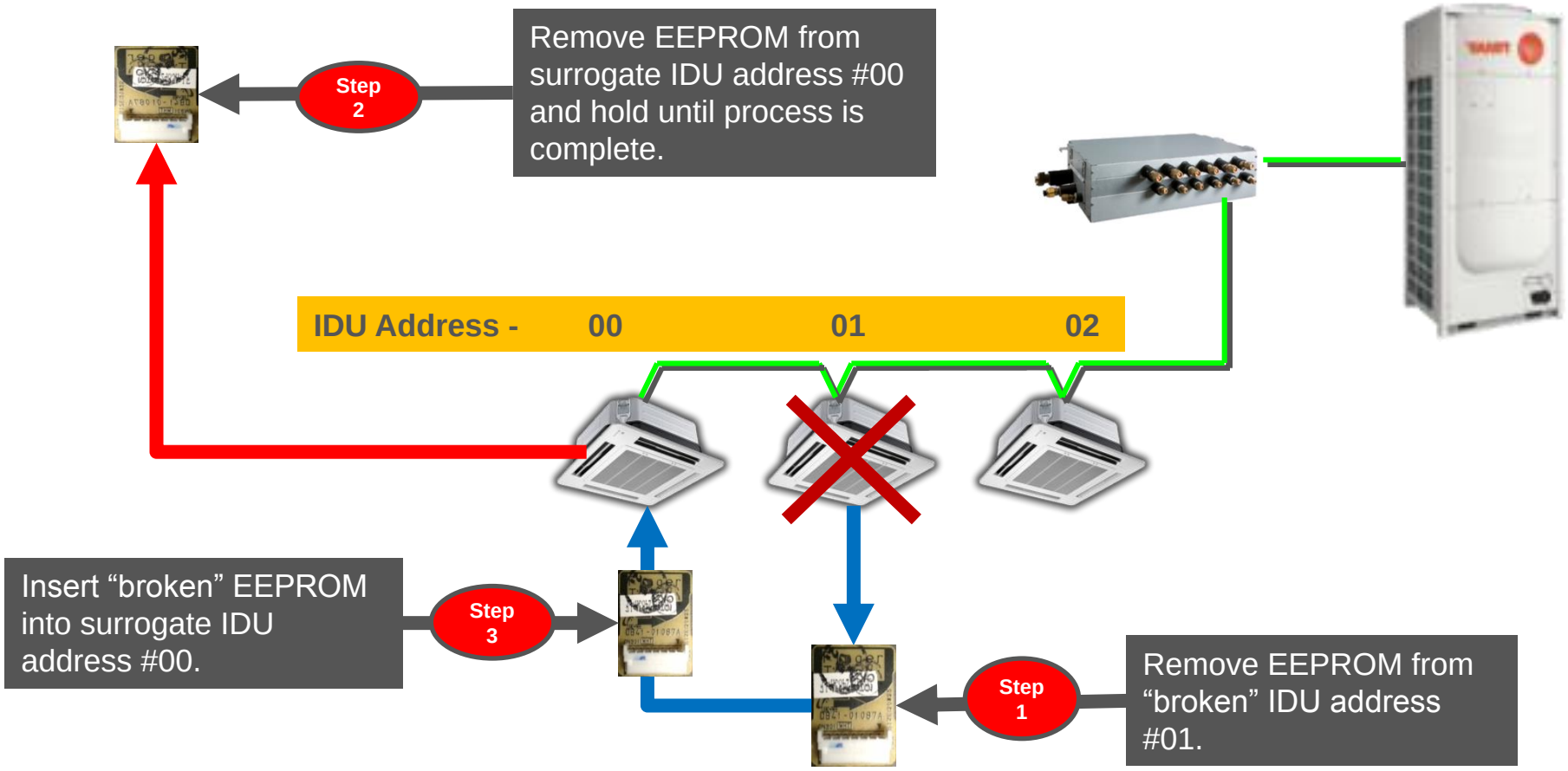
Fix

- Turn off power to affected unit.
- Push K3 button and reset system.
  - If error clears and addresses are scrolling, the system is ready.
- Connect TUT to the system and make sure it is communicating and working properly.
- From here, there are two ways to proceed – UART or Hot Swap Technique.
  - This training will focus on the Hot Swap Technique.
  - Information on the UART method can be found on Comfortsite when you download any of the IDU firmware upgrades (Currently there is only an Aux Heat firmware upgrade).
    - www.comfortsite.com

Fix – Hot Swap Technique

1. Remove EEPROM from “broken” unit.
   - Do not mix up EEPROMS
     - Take a picture of it
     - Mark it to identify
2. Find a surrogate IDU and while the surrogate IDU is still powered up, remove the EEPROM from it
   - Preferably an exact match in size and tonnage.
   - If IDU is “too” different” it may not work (i.e., 7MBH floor/ceiling swapped with an 96MBH HSP ducted unit).
3. Put the “broken” EEPROM into the surrogate unit.
   - Timing is important in that you will have about three minutes to complete the swap before you trip again on E201 because the surrogate IDU is no longer communicating.
   - Plan accordingly.

Example:


Step 2
Remove EEPROM from surrogate IDU address #00 and hold until process is complete.
IDU Address - 00 01 02
Insert “broken” EEPROM into surrogate IDU address #00.
Step 3
Step 1
Remove EEPROM from “broken” IDU address #01.

Fix – Hot Swap Technique

- Return to TUT
- Verify system is communicating
- Click the following tabs
  - Add-On ----> Indoor Option Writer
- Select the surrogate IDU
  - Write the complete Product Option Code, Installation Option Code and Installation Option Code 2 for the type of unit that you have.
  - Click Write Option

Fix – Hot Swap Technique

- Once download of option codes is successful
  - Remove EEPROM from surrogate IDU
  - Re-install surrogate EEPROM
  - Re-install the once “broken” EEPROM in the unit originally causing issues
  - Hard reset the system (Power down IDU’s, MCU’s and ODU.
  - Reset SW51, SW52 and SW53 to correct total(s) on ODU
  - Power on the system
  - Press K3 on the ODU
  - Disconnect from TUT and reconnect.
  - Verify all IDU’s can be seen in TUT and the E201 has gone away.

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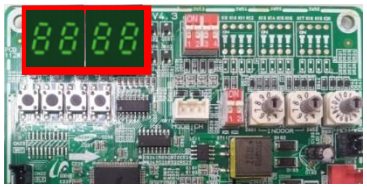
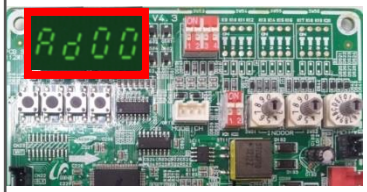
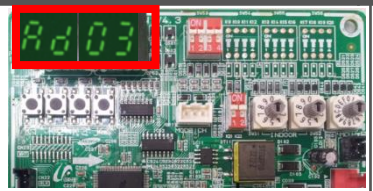
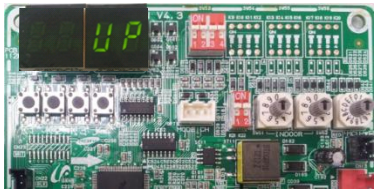
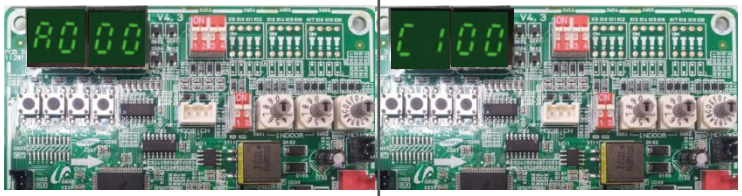
1		● Check display digit - Quad “8’s” flicker consecutively from left to right - Check whether seven-digit display has any defects (missing segments or digits)
2		● ODU Starts Tracking - “Ad” means ODU is tracking and assigning auto addresses - Right 2 digits show actual number of communicating indoor units. ***If final number is not equal to the number of units dialed into switches 51 and 52, the ODU is not communicating with a unit(s).***
3		● Communication between outdoor and indoor unit - ODU tracking indoor unit address 0 to 63 - If ODU receives response from indoor unit, the unit count displays on the right side ★ 0~63 : Indoor address

If it is a new start up you should get to UP. Press K1 for 5 sec to commission the system.

After commissioning (if new start up) or if after EEPROM replacement, ODU scrolls IDU addresses and/or MCU addresses

4		● UP display - After tracking is complete, “UP” is shown on display at initial installation. - “UP” means UnPrepared : Not ready to operation - Hit K1 5-sec to implement **Auto Commissioning** (Clg/Htg mode) → more than 1 hour or implement Auto Trial Operation → “UP” disappearance → normal operation	
5			● Digit meaning - A0 XX : Indoor address - C1 XX : MCU address

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