Legacy to FM*Live* FMU Upgrade Procedure

CAUTION	The Supercap Assembly is shipped uninstalled with the cabinet and encased in bubble wrap for protection. Do ***NOT*** apply power to the FMU prior to installing the Supercap Assembly as it will damage the EAPro Assembly. Please see Unbox the FM*Live* Upper Cabinet Assembly.

This product bulletin focuses upgrading FMU hardware from a Legacy FMU configuration to an FM*Live* configuration.

IMPORTANT	***Before*** any upgrade, ensure transactions are downloaded from the old mainboard and verified. This prevents permanent data loss. ***After*** the upgrade, beware of the following ***unsupported*** features: • **FMU Satellites –** All FMUs are Master FMUs in FM*Live*. • **Transaction Printing** (label cable connections for satellites and transaction printer to prevent confusion in the future)

Contents

Prepare to Remove the Legacy Upper Cabinet Assembly

CAUTION	This procedure should NOT be attempted in a rainy environment or during inclement weather.

1. Turn ***OFF*** FMU power or main power breaker.
2. Open upper and lower FMU cabinet doors.
3. Power down and disconnect any third-party devices (e.g., network equipment or other communication devices). These devices might be housed inside the FMU or inside a nearby building. Contact your IT administrator if you have questions.
4. Using manilla labels, label all cables and connections to adapters installed in the FMU mainboard (e.g., modem, network card, etc.).

NOTE	Do ***NOT*** skip this step.

5. Check the FMU Mainboard (941B0222) for a Compact Flash Card (Figure 1).

NOTE	In a Legacy FMU, the compact flash card contains the necessary files and instructions for the FMU to boot-up as well as other pertinent system information for proper functionality. However, in an FMLive unit, the boot files and other files used for proper functionality have been moved to the EAPro micro SD card; therefore, the micro SD card is crucial to the bootup process. The Compact Flash card is still used by the FMLive FMU to store image files and core dumps, but these files do not play a role in the bootup process.

I found the Legacy Compact Flash Card. Any reason I may need to keep it?

In the rare event the FMLive mainboard in the new upper cabinet assembly is missing its compact flash card, you may need to perform the following steps:

1. Ensure FMU power is OFF.
2. Insert the compact flash card (formerly used in the Legacy mainboard) into the new FMLive mainboard.
3. Continue the upgrade as outlined.

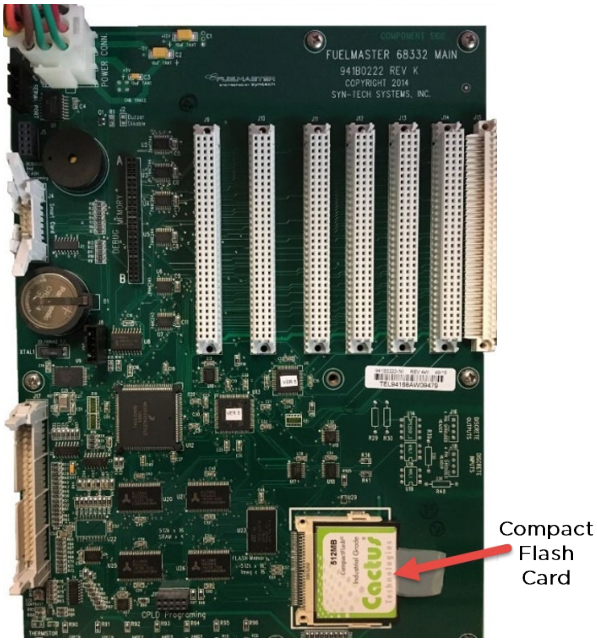


Figure 1 Compact Flash Card on FMU Mainboard 941B0222

4. Using manilla labels, label all cables connected to the Satellite I/O Board (Figure 2).

Cable	**Connection**
Receipt Printer	J2
Transaction Printer	J3
Tank Monitor Unit (TMU)	J4
FMU Satellite	J5; J6
Satellite I/O Ribbon Cable to Pedestal	J7
50A Pump Relay Board/Dual Control Relay PRB2; PRB1	J8; J9

NOTE	Do ***NOT*** skip this step.

5. Disconnect the cables, positioning them out of harm's way.

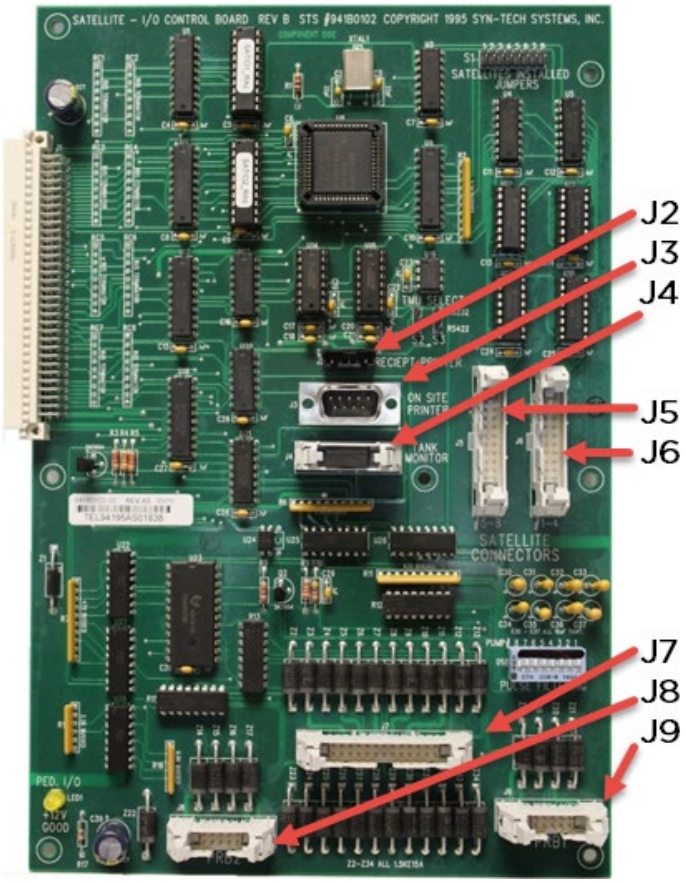


Figure 2 FMU Satellite I/O Board (941B0102)

6. Note whether there is anything plugged into the AC receptacle (Figure 3), and determine whether it is required in the new FM*Live* system.

NOTE	This receptacle typically supplies power to a network switch or external modem.

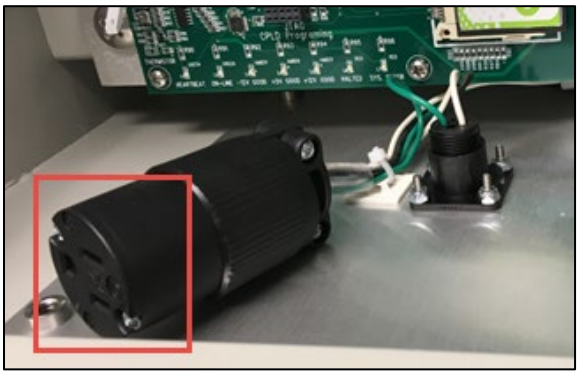


Figure 3 AC Receptacle

7. Disconnect the power and communication harness barrel connectors that feed the upper cabinet (Figure 4).

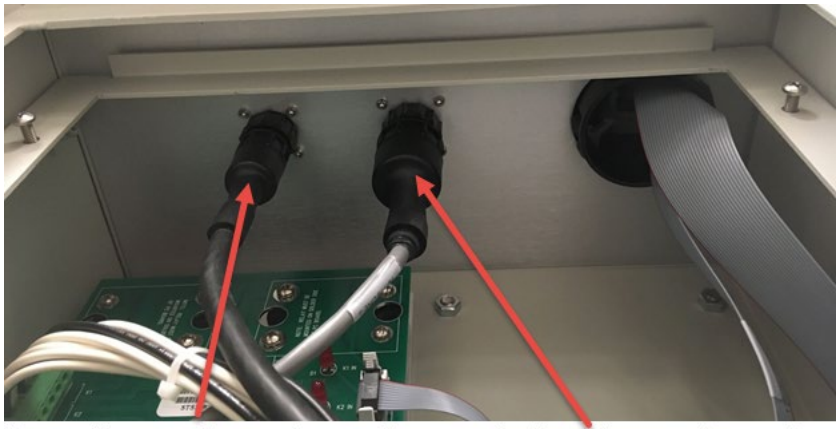


Figure 4 View from the FMU Pedestal

Remove the Legacy Upper Cabinet Assembly

1. Remove the six (6) bolts that secure the upper cabinet to the pedestal (Figure 5), and store in a secure place.

IMPORTANT	Do *NOT* discard the bolts! They will be used to attach the new FMU cabinet.

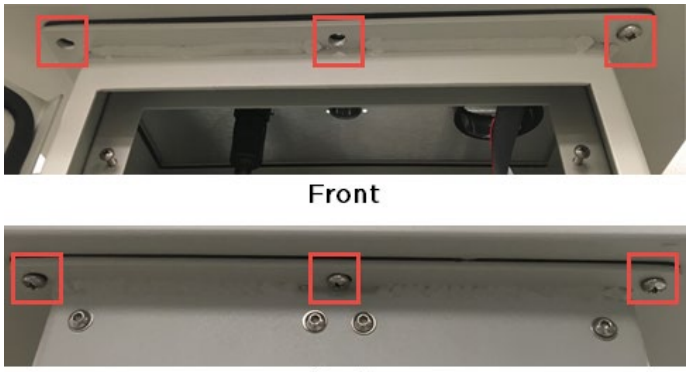


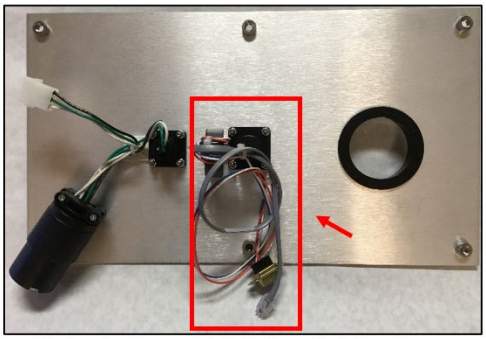
Figure 5 Bolt Removal

2. Ensure all cables and harnesses are disconnected.

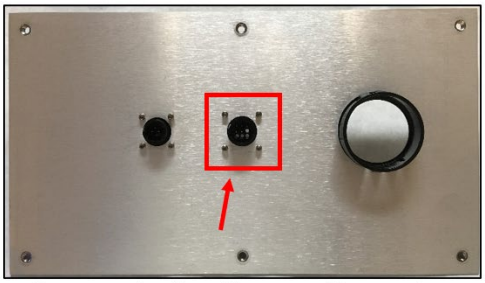
IMPORTANT	Before you accomplish the next step, ensure you have a place to put the Legacy FMU upper cabinet once it is removed as it must be handled with care.

3. Carefully separate and remove the entire upper cabinet assembly from the FMU pedestal.

NOTE	If you are only performing the FMU Upper Cabinet upgrade, then you will continue to use the same interface plate (931B0400) (Figure 6). The telephone (RJ-11) jack and DB-9 printer connection are not used in an FM*Live* system; therefore, the Communication Harness (step 9) will not be used. Tuck the harness out of the way or disconnect it completely and remove it from the FMU.



Telephone and Printer Cables



Communication Harness Connector

Figure 6 Interface Plate 931B0400

IMPORTANT	If you are installing the FMU Power Conditioner Upgrade along with the FMU Upper Cabinet upgrade, a different interface plate is used (931B0400B). Refer to Product Bulletin #231 for more information.

Unbox the FM*Live* Upper Cabinet Assembly

CAUTION	The Supercap Assembly is shipped uninstalled with the cabinet and encased in bubble wrap for protection. Do ***NOT*** apply power to the FMU prior to installing the Supercap Assembly as it will damage the EAPro Assembly.

1. Open the cabinet shipping carton.
2. Peel away the foam to expose the Supercap components. The Supercap assembly is secured to the face of the door by the shipping foam (Figure 7).

Figure 7 Assembly Protected by Shipping Foam

Figure 8 Bubble-wrapped Supercap Assembly

3. Remove the bubble-wrapped Supercap assembly (Figure 8), and set in a safe place.

Install the FM*Live* Upper Cabinet Assembly

1. Lift the FM*Live* Upper Cabinet Assembly onto the top of the pedestal with the door facing the front of the unit.
2. Ensure the gasket between the upper cabinet and pedestal is seated properly.
3. Carefully attach the assembly with five (5) of the bolts removed from the Legacy Upper Cabinet assembly.

IMPORTANT	A slightly longer bolt is used for the Supercap installation in the far-right front position (circled below). This bolt will hold the Supercap assembly in place (Figure 9).

CAUTION	Never connect the Supercap to the EAPro assembly while the FMU is powered on and power is supplied to the EAPro. This may damage the EAPro assembly, Supercap, or both. If you must disconnect the Supercap from the EAPro, disconnect the Supercap only after FMU power is OFF and the Supercap has completely discharged. This can take up to four (4) minutes.

4. Install the bolt to secure the Supercap to the cabinet.
5. Connect the Supercap cable (144F0219-20) to the EAPro assembly (connector J30) (Figure 9). The other end of the cable should already be connected to the Supercap (connector J2).

Figure 9 Supercap Installation

6. Connect the power harness barrel connector that feeds power to the upper cabinet (Figure 4).

7. Reconnect the cables from the Pedestal I/O Board to connector (J7) (Figure 10).
8. Reconnect cables from the 50A Pump Relay Assembly or Dual Control Board to connectors PRB1 (J9 – Hoses 1-4) and PRB2 (J8 – Hoses 5-8).

NOTE	FMU Satellites and transaction printing are not supported by FM*Live* systems. Therefore, these cables will not be re-connected.

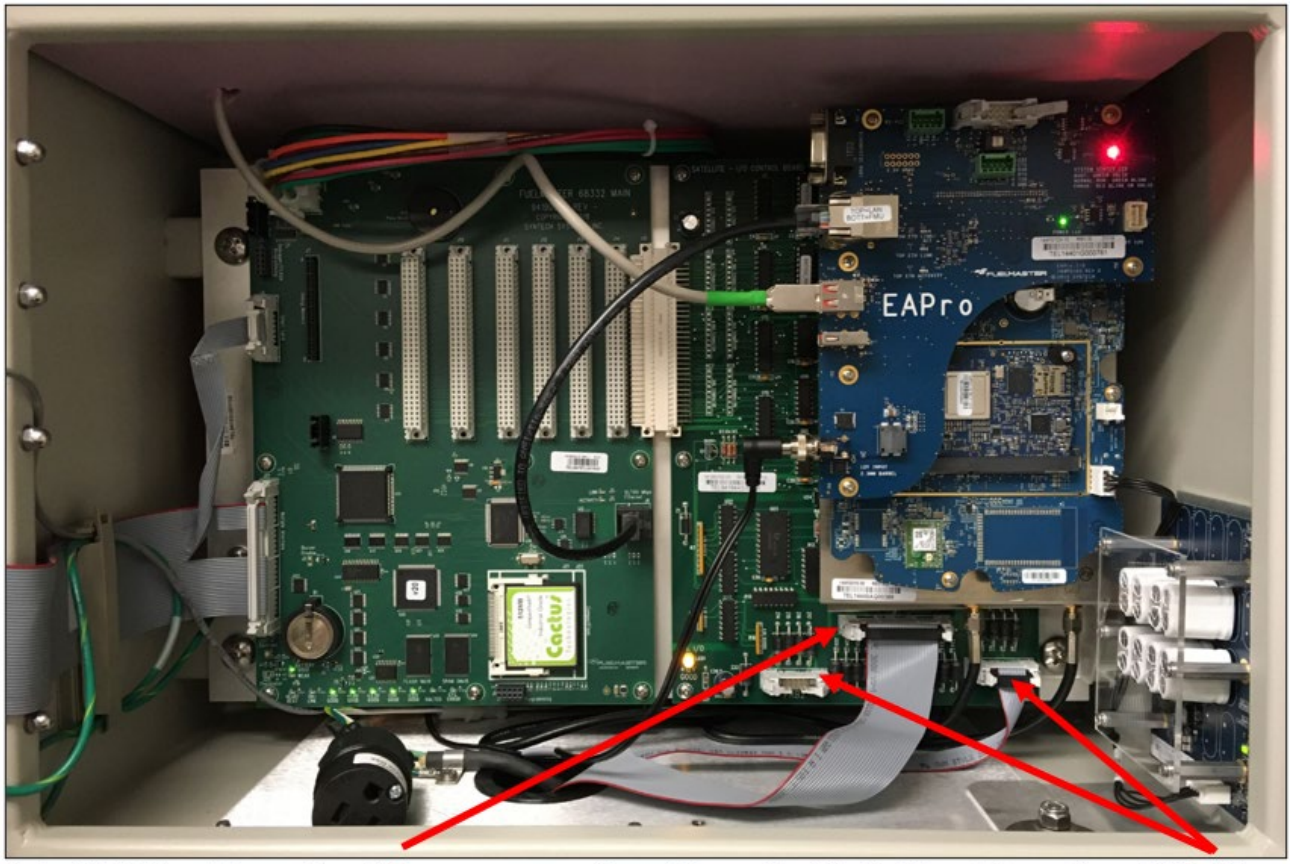


Figure 10 Reconnecting Cable Connections

Cabinets with Wired Ethernet Surge Protection Kit (144F0249)

*Wired Ethernet models only.

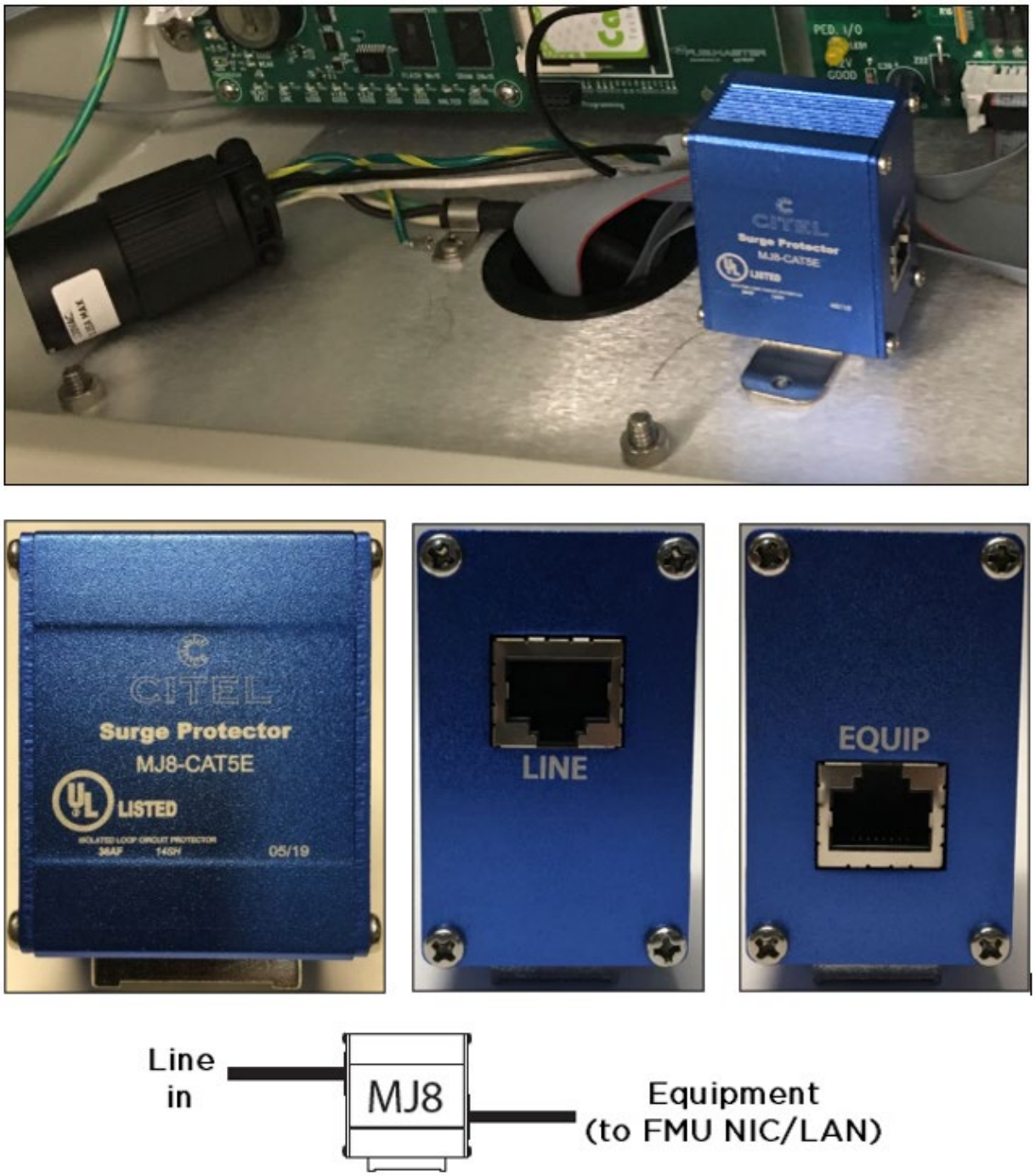


Figure 11 Ethernet Surge Protector Kit, CAT5e, 20V, UL, 497B (144F0249)

EAPro Board Connections

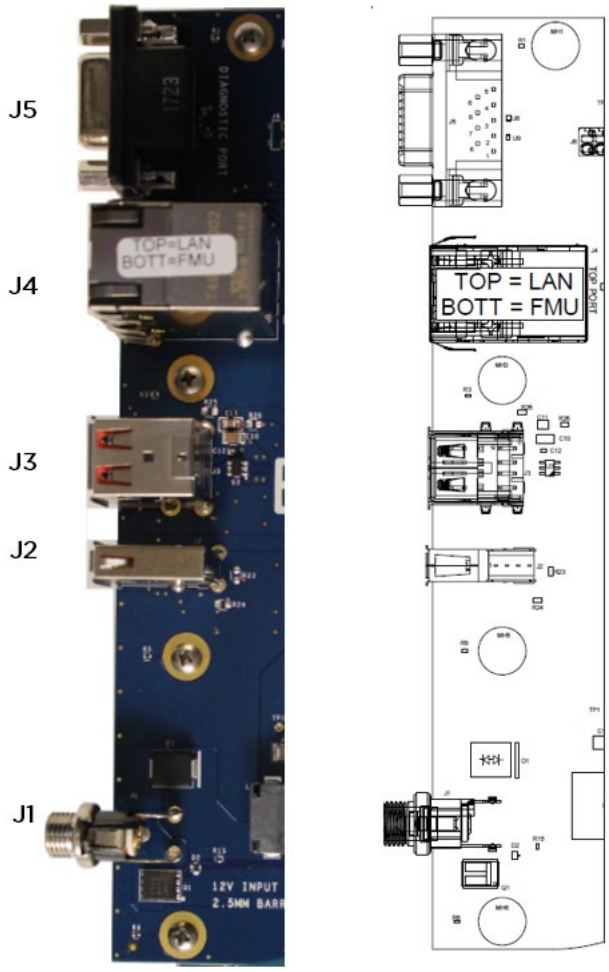


Figure 12 EAPro Left-side Top to Bottom Detail

EAPro Board Connections

Designation	Connection	Comments
J5	Diagnostic Port	Syntech usage only
J4	Ethernet	Top = LAN; Bottom = FMU mainboard
J3	USB	
J2	USB	*If using AIM*: AIM External Radio Module (ERM)
J1	EAPro Power	12Volt 3Amp DC Supply (fed from the Power Management Board)

Post Upgrade Initialization and Registration Overview

Initially, the Boot Sequence for FM*Live* units with 941B0322A Mainboards is powered OFF with all required cables and harnesses connected.

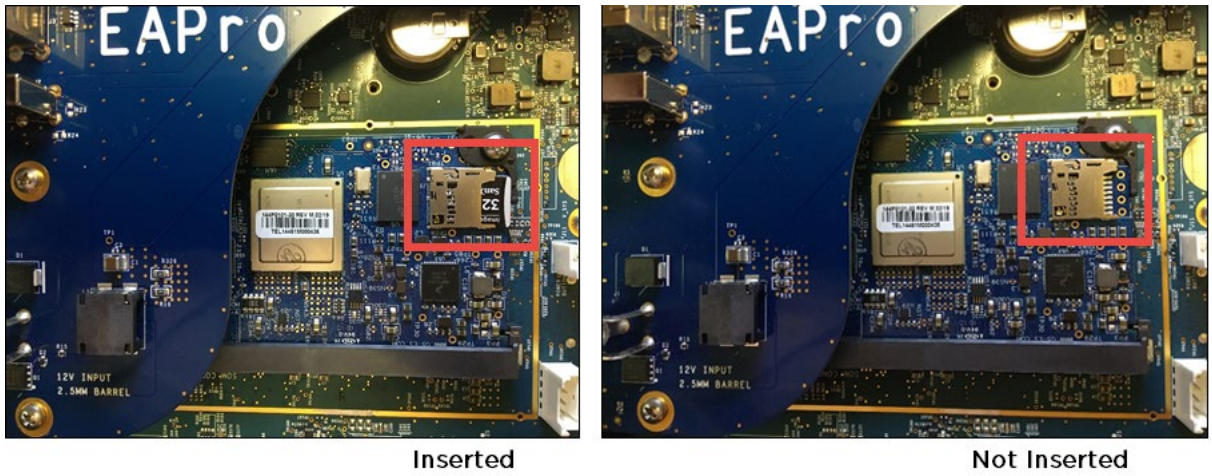
Much like a PC's hard drive, the **microSD (uSD) card** (Figure 13) is the primary boot memory and storage for the EAPro.

Figure 13 MicroSD (uSD) Card

The most important contents of the microSD card are:

- Operating System (Syntux)
- Certifications for authorization with Syntech servers
- Attributes files for networking configuration
- Transaction data
- Log (audit) files
- The FM*Live* unit code
- AIM firmware image
- Mainboard image
- AIM encryption keys

IMPORTANT	Every microSD card is uniquely programmed for a specific customer/account/site. You cannot swap the microSD card to another FM*Live* FMU without causing operational issues on that FMU.



Inserted Not Inserted

Figure 14 MicroSD Card

The microSD card comes pre-installed in the EAPro Assembly. In the case where a site has not been chosen (site: 'TBD'), Syntech will ship an FM*Live* FMU without a microSD card installed (typically per the installer's instructions). Once the site details have been provided, Syntech will then program and ship the microSD card separately. The microSD card must be installed for proper FMU operation, initialization, and registration.

Care must be taken during installation as the microSD card is delicate to handle. Also, the microSD card can only be inserted one way. If the card is not going in easily, do not force it! Verify you are inserting the microSD card correctly and try again.

Figure 14 shows the microSD card inserted and not inserted on the EAPro assembly.

Install the MicroSD Card

1. Verify the power is OFF.
2. Carefully unscrew the Phillips screw, and remove the locking lever, setting the screwdriver and screw in a safe place (Figure 15).

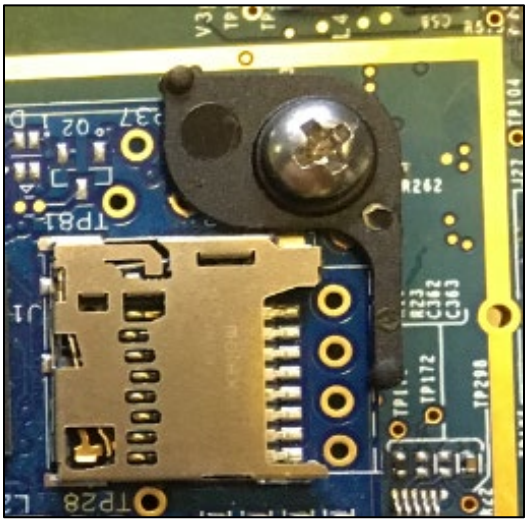


Figure 15 Screw and Locking Lever

3. Insert the microSD card observing proper orientation (Figure 16).

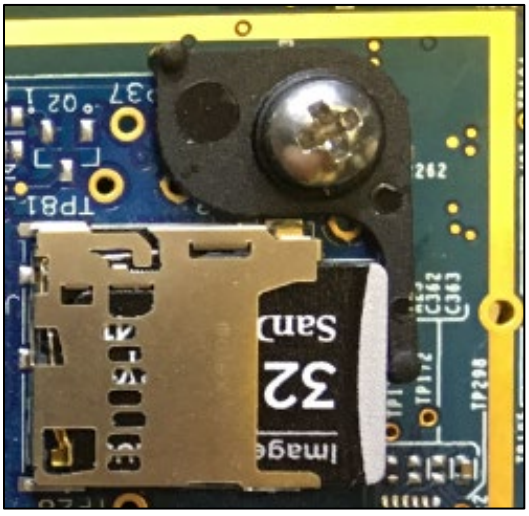


Figure 16 MicroSD Card Inserted

4. Re-install the Phillips screw and locking lever as shown. Installed properly, the lever should not allow the SD card to come out or be removed.

Power ON / Startup Sequence

1. Apply Power. There is an approximately 3-5 second delay before power is supplied to the EAPro and the mainboard.

NOTE	Once booted, the EAPro will sound with four short beeps followed by a long beep.

2. Check the Mainboard for the following:
   - All LEDs Flash except the 'Halted' LED (D13).
   - The 'Battery Good' LED (D4) should be lit.
   - The 'voltage' LEDs (D8 to D11) and the 'Heartbeat' LED (D6) all light-up solid Green.
   - The 'Heartbeat' LED (D6) will start to flash after a few seconds.
   - The FMU will go through its boot sequence and then display the main prompt unless it needs configuration information.
   - If configuration information has not been downloaded, the FMU will beep periodically and display the message, "Requesting Configuration" until it receives the information.
3. Check the Supercap for the following:
   - LED (D4) turns red (Charging) when power is applied.
   - LED (D4) will turn green (Normal) after a minute or two indicating the Supercap is charged.
4. Check the EAPro for the following:
   - LED (D17 - System Status) will be solid green during the boot process.

IMPORTANT	Gen 3 EAPros require Syntux 4. If a uSD card configured with Syntux 3 is installed, the EAPro will not function correctly. This will be indicated by a solid red System Status LED and must be addressed immediately. 1. Power off the unit. 2. Remove and reinsert the uSD card, ensuring it is pushed all the way in. 3. Power on the unit. 4. If the red LED re-appears, power down the unit. Contact Syntech Customer Satisfaction Center.

   - LED (D12 - Power LED) will also be green.
   - LED (D17) will start to blink when the EAPro has completed the boot cycle.
   - LED (D16 - Bottom ETH LINK / ACT) should start to blink indicating there is successful communication with the mainboard.

Power OFF / Shutdown Sequence

Power down the FMU. The Discharging LED (D5) on the Supercap will turn blue, initiating shutdown for the EAPro. Then, the System Status LED (D17) will change from flashing green to flashing red and begin beeping every 2 seconds. Eventually, the unit will transition to a series of very short flashes and beeps before shutdown is complete.

- Gen1/Gen2 EAPro: The System Status LED (D17) will turn off briefly and then come back on. It will stay solid green until the Supercap completely discharges and the LED goes off. Once this happens, the unit may be serviced.
- Gen3 EAPro (indicated by label): Unit may be serviced immediately after the beeping ends.

NOTE	This version of EAPro will not discharge the Supercap completely. It can take hours for Supercap to eventually discharge and turn off the blue LED.
IMPORTANT	If you must disconnect the Supercap from the EAPro assembly, disconnect the Supercap only after FMU power is OFF. When reconnecting, always plug in the Supercap (charged or discharged) into an EAPro when FMU is power OFF. Otherwise, you will damage the Supercap and EAPro assembly.

FMU Prompts and Messaging During Boot-up

Once the FM*Live* boot-up process begins, it runs through the FMU initialization displaying prompts and messages pertaining to installed peripherals and configuration, taking less than one second per peripheral. Below is an example of prompts and messages displayed during the FM*Live* boot-up process and captured in FMU memory (Figure 17).

```
1. 'FMLive MAINBOARD       v7.94.0          ' 12/15 12:29:14
2. 'NMI POWER ON RESET                      ' 12/15 12:29:14
3. 'BUILT ON: 2020.11.20-112524             ' 12/15 12:29:15
4. 'COPYRIGHT 2020 SYNTECH SYSTEMS INC.     ' 12/15 12:29:16
5. 'TESTING WATCHDOG TIMER...               ' 12/15 12:29:17
6. 'WATCHDOG TIMER TEST -- PASSED!          ' 12/15 12:29:19
7. 'MODEM TYPE: NONE DETECTED!              ' 12/15 12:29:20
8. 'MAINBOARD LAN INTERFACE DETECTED!       ' 12/15 12:29:21
9. 'MULTI INPUT BOARD DETECTED!             ' 12/15 12:29:22
10.      'COMPACT FLASH CARD DETECTED!            ' 12/15 12:29:23
11.      'INITIALIZING RTIP NETWORK STACK...      ' 12/15 12:29:25
12.      'INITIALIZING COMPACT FLASH...           ' 12/15 12:29:25
13.      'INITIALIZING VIRTUAL FILE SYSTEM...     ' 12/15 12:29:26
14.      'INITIALIZING NETWORKING...              ' 12/15 12:29:37
15.      'CHECKING SYSTEM CONFIGURATION...        ' 12/15 12:29:42
16.      'CHECKING SYSTEM CONFIGURATION...        ' 12/15 12:29:46
17.      '** <CUSTOM HOME PROMPT (LINE 1) DISPLAYED> ** ' 12/15 12:29:53
18.'** <CUSTOM HOME PROMPT (LINE2) DISPLAYED>  ** ' 12/15 12:29:53
```

Figure 17 Prompts and Messages

NOTE	Prompts and messaging may vary according to the options installed (Wired Ethernet, Cell Modem, Wi-Fi, Credit Card, etc.).

Custom Home Prompt

The customizable **Custom Home Prompt** appears when the process is complete and registration is successful (Figure 18).

```
**FUELMASTER FUELS ACCOUNTING SYSTEM**

PRESS ENTER FOR AIM USER ID THEN PRESS 1
```

Figure 18 Custom Home Prompt

Configuration and Registration Alerts

During boot-up, if there is a delay or error in reading the FMU configuration or if registration fails, messages like the following will be displayed (Figure 19).

```
571' ** FuelMaster FUELS ACCOUNTING SYSTEM **' 12/10 16:15:06
572' ***    WAITING FOR CONFIGURATION     ***' 12/10 16:15:06
573'    UNEXPECTED ERROR AT LINE 09279 IN    ' 12/10 16:15:06
574'                  cfg.c                  ' 12/10 16:15:06
575' ** FuelMaster FUELS ACCOUNTING SYSTEM **' 12/10 16:15:20
576'           REQUESTING CONFIG...          ' 12/10 16:15:20
577' ** FuelMaster FUELS ACCOUNTING SYSTEM **' 12/10 16:15:34
578' ***    WAITING FOR CONFIGURATION     ***' 12/10 16:15:34
579'    UNEXPECTED ERROR AT LINE 09279 IN    ' 12/10 18:50:28
                 cfg.c                  ' 12/10 18:50:28
```

Figure 19 Configuration and Registration Alerts

NOTE	The FMU attempts to retrieve the configuration every couple of seconds, so these messages should only appear momentarily. If the FMU cannot retrieve the configuration, verify the short Ethernet cable is plugged in securely between the EAPro and the mainboard.

New Features

FM*Live* Upper Cabinet Board Assembly Identification

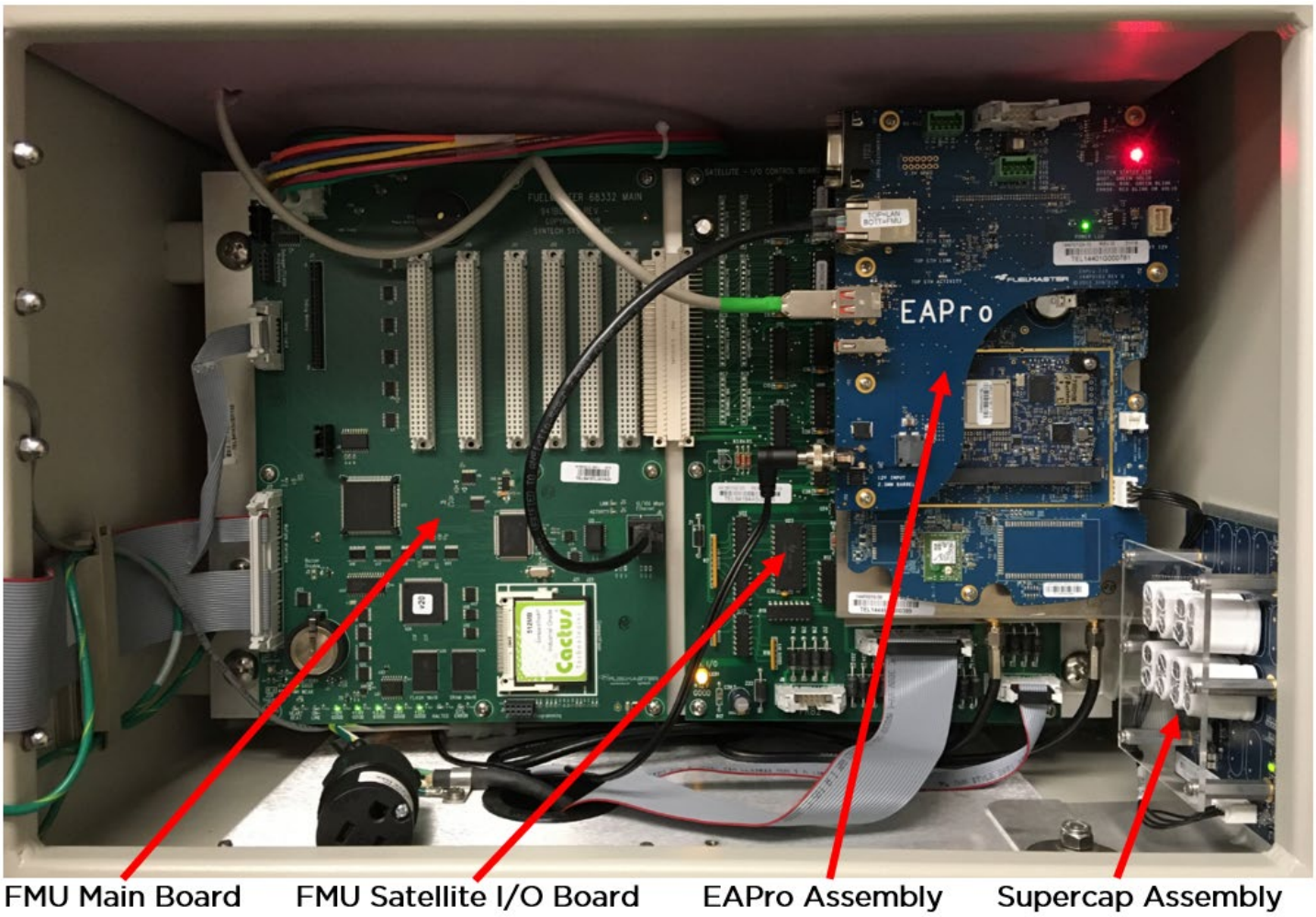


Figure 20 FM*Live* Upper Cabinet Board Assembly Identification

Differences between FMU Mainboard 941B0222 and 941B0322 (new)

- Fewer components on board
- Network interface (RJ-45 for Ethernet) is built into the Mainboard

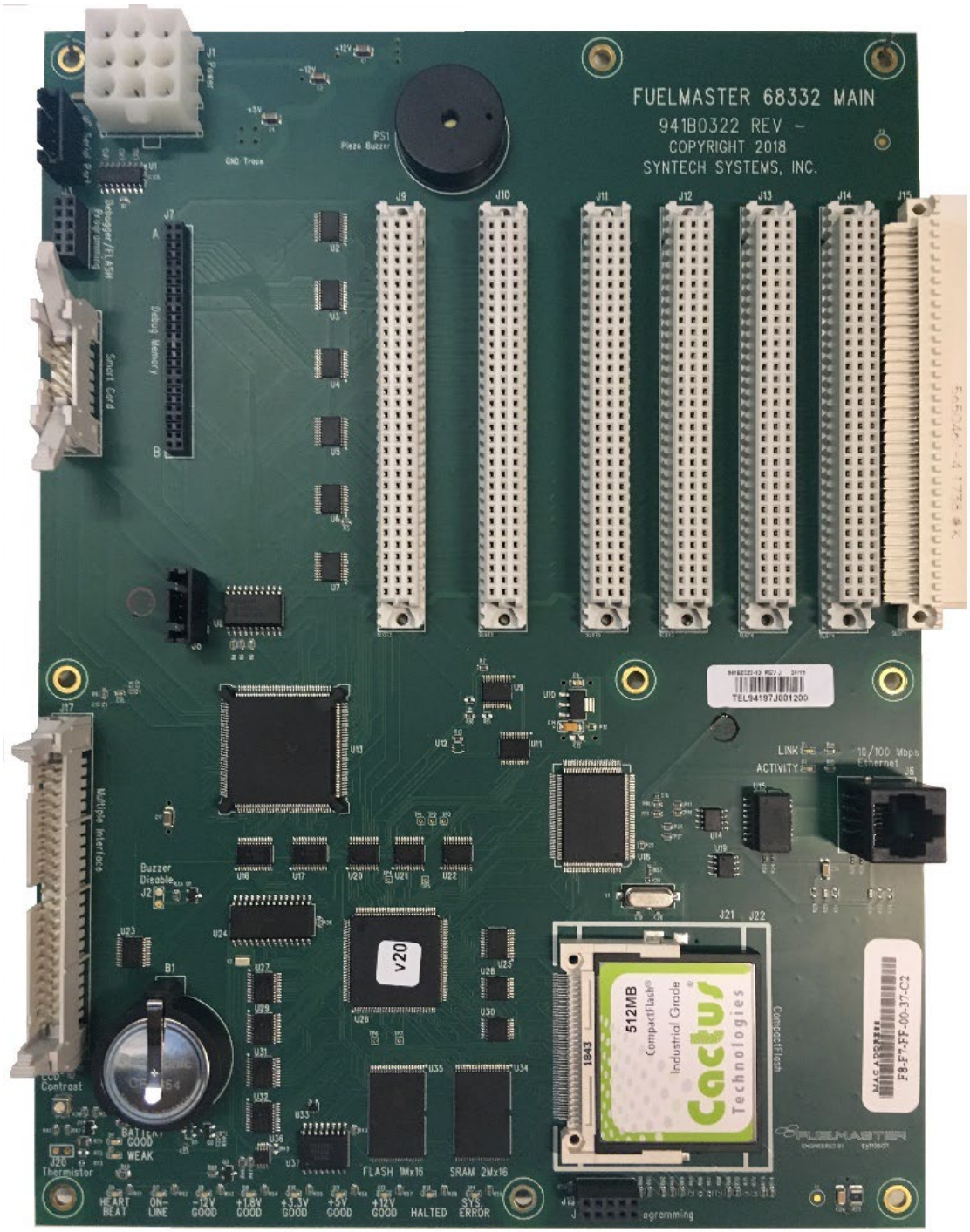


Figure 21 New Mainboard 941B0322A

Differences between Satellite I/O Board 941B0102B, 941B0102F and 941B0102D (new)

- Fewer components on the board
- TMU connections are made directly to the EAPro assembly

Figure 22 New Satellite I/O Board 941B0102D

EAPro Assembly

The Embedded Applications Processor (EAPro) Assembly is the heart of the FM*Live* system.

Figure 23 EAPro Assembly

Supercap Assembly with Cable Connections

The Supercap's primary function is to provide backup power to the EAPro exclusively. In the event of a power-fail, the EAPro relies on the Supercap (instead of a battery back-up option) to provide orderly shutdown and to save transaction data.

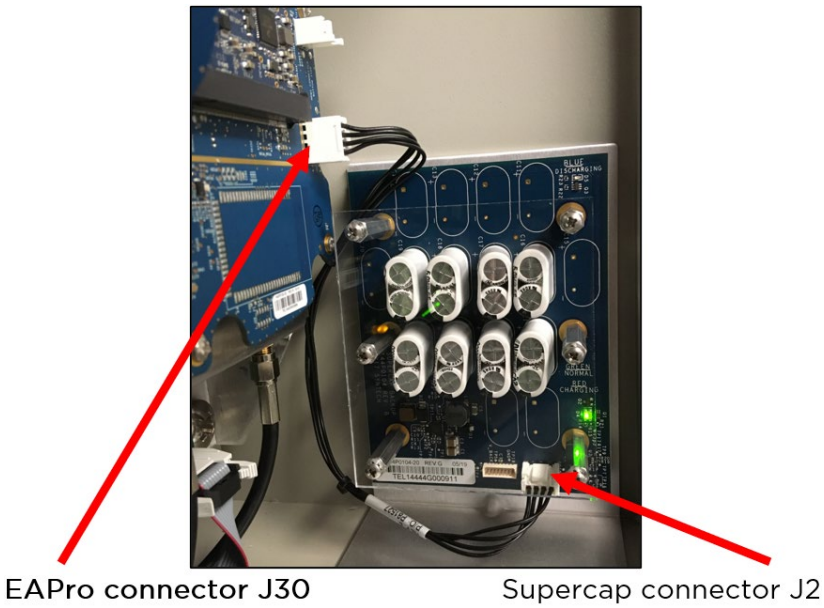


Figure 24 Supercap Assembly with Connections

TMU Connections to the EAPro Assembly

In the FM*Live* unit, the Tank Monitor Unit (TMU/ATG) connector is at the top of the EAPro board.

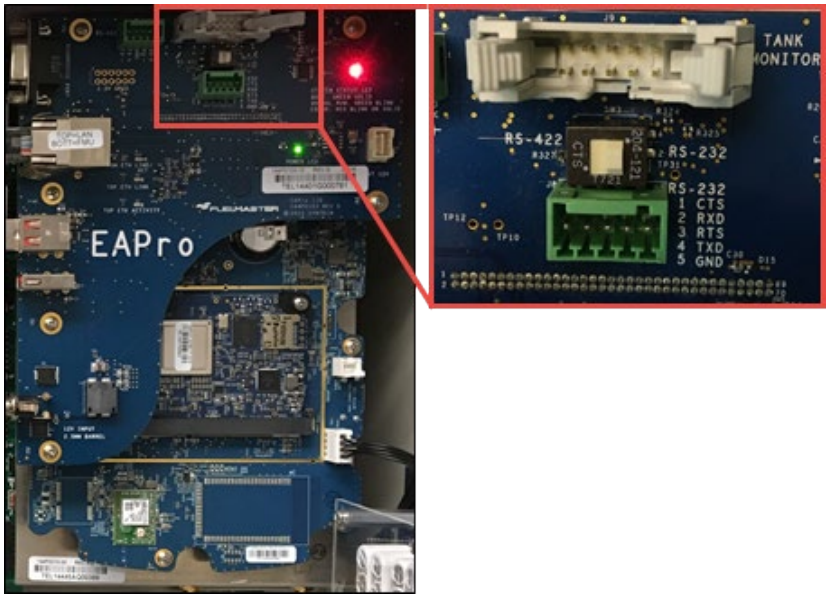


Figure 25 TMU Connector Magnified

Connect the TMU Cable

1. Verify the switch underneath the TMU connector is slid to the right (Figure 25), selecting RS-232.
2. Connect the TMU cable (Figure 26).

NOTE	The connector is keyed (tabbed), so it can only be installed in one direction. If there is resistance, do ***NOT*** force the connector. Verify the key is oriented correctly and try again.

Figure 26 TMU Cable Connected to EAPro

Upgrade to Wired Ethernet - Part Numbers

Part #	Description
UPG4610	FMLIVE, UPGRADE, WIRED ETH, PROKEE, 2-4 HOSE
UPG4610-D5+	FMLIVE, UPGRADE, WIRED ETH, PROKEE, DUAL CNTL, 5-8 HOSE
UPG4610-F5+	FMLIVE, UPGRADE, WIRED ETH, PROKEE, 50A, 5-8 HOSE
UPG4615	FMLIVE, UPGRADE, WIRED ETH, PROKEE, AIM, 2-4 HOSE
UPG4615-D5+	FMLIVE, UPGRADE, WIRED ETH, PROKEE, AIM, DUAL CNTL, 5-8 HOSE
UPG4615-F5+	FMLIVE, UPGRADE, WIRED ETH, PROKEE, AIM, 50A, 5-8 HOSE
UPG4615-T	FMLIVE, UPGRADE, WIRED ETH, PROKEE, AIM, 2-4 HOSE, TAN
UPG4810	FMLIVE, UPGRADE, WIRED ETH, PROKEE/PROX, 2-4 HOSE
UPG4620-D5+	FMLIVE, UPGRADE, WIRED ETH, PROKEE/PROX, DUAL CNTL, 5-8 HOSE
UPG4620-F5+	FMLIVE, UPGRADE, WIRED ETH, PROKEE/PROX, 50A, 5-8 HOSE
UPG4625	FMLIVE, UPGRADE, WIRED ETH, PROKEE/PROX, AIM, 2-4 HOSE
UPG4625-D5+	FMLIVE, UPGRADE, WIRED ETH, PROKEE/PROX, AIM, DUAL CNTL, 5-8 HOSE
UPG4625-F5+	FMLIVE, UPGRADE, WIRED ETH, PROKEE/PROX, AIM, 50A, 5-8 HOSE
UPG4625-T	FMLIVE, UPGRADE, WIRED ETH, PROKEE/PROX, AIM, 2-4 HOSE, TAN
UPG4630	FMLIVE, UPGRADE, WIRED ETH, PROKEE/MAGSTRIPE, 2-4 HOSE
UPG4630-D5+	FMLIVE, UPGRADE, WIRED ETH, PROKEE/MAGSTRIPE, DUAL CNTL, 5-8 HOSE
UPG4630-F5+	FMLIVE, UPGRADE, WIRED ETH, PROKEE/MAGSTRIPE, 50A, 5-8 HOSE
UPG4635	FMLIVE, UPGRADE, WIRED ETH, PROKEE/MAGSTRIPE, AIM, 2-4 HOSE
UPG4635-D5+	FMLIVE, UPGRADE, WIRED ETH, PROKEE/MAGSTRIPE, AIM, DUAL CNTL, 5-8 HOSE
UPG4635-F5+	FMLIVE, UPGRADE, WIRED ETH, PROKEE/MAGSTRIPE, AIM, 50A, 5-8 HOSE

Upgrade to Cellular - Part Numbers

Part #	Description
UPG4710	FMLIVE, UPGRADE, CELLULAR, PROKEE, 2-4 HOSE
UPG4710-D5+	FMLIVE, UPGRADE, CELLULAR, PROKEE, DUAL CNTL, 5-8 HOSE
UPG4710-F5+	FMLIVE, UPGRADE, CELLULAR, PROKEE, 50A, 5-8 HOSE
UPG4710-T	FMLIVE, UPGRADE, CELLULAR, PROKEE, TAN
UPG4715	FMLIVE, UPGRADE, CELLULAR, PROKEE, AIM, 2-4 HOSE
UPG4715-D5+	FMLIVE, UPGRADE, CELLULAR, PROKEE, AIM, DUAL CNTL, 5-8 HOSE
UPG4715-F5+	FMLIVE, UPGRADE, CELLULAR, PROKEE, AIM, 50A, 5-8 HOSE
UPG4715-T	FMLIVE, UPGRADE, CELLULAR, PROKEE, AIM, TAN
UPG4720	FMLIVE, UPGRADE, CELLULAR, PROKEE/PROX, 2-4 HOSE
UPG4720-D5+	FMLIVE, UPGRADE, CELLULAR, PROKEE/PROX, DUAL CNTL, 5-8 HOSE
UPG4720-F5+	FMLIVE, UPGRADE, CELLULAR, PROKEE/PROX, 50A, 5-8 HOSE
UPG4725	FMLIVE, UPGRADE, CELLULAR, PROKEE/PROX, AIM, 2-4 HOSE
UPG4725-D5+	FMLIVE, UPGRADE, CELLULAR, PROKEE/PROX, AIM, DUAL CNTL, 5-8 HOSE
UPG4725-F5+	FMLIVE, UPGRADE, CELLULAR, PROKEE/PROX, AIM, 50A, 5-8 HOSE
UPG4730	FMLIVE, UPGRADE, CELLULAR, PROKEE/MAGSTRIPE, 2-4 HOSE
UPG4730-D5+	FMLIVE, UPGRADE, CELLULAR, PROKEE/MAGSTRIPE, DUAL CNTL, 5-8 HOSE
UPG4730-F5+	FMLIVE, UPGRADE, CELLULAR, PROKEE/MAGSTRIPE, 50A, 5-8 HOSE
UPG4735	FMLIVE, UPGRADE, CELLULAR, PROKEE/MAGSTRIPE, AIM, 2-4 HOSE
UPG4735-D5+	FMLIVE, UPGRADE, CELLULAR, PROKEE/MAGSTRIPE, AIM, DUAL CNTL, 5-8 HOSE
UPG4735-F5+	FMLIVE, UPGRADE, CELLULAR, PROKEE/MAGSTRIPE, AIM, 50A, 5-8 HOSE

TIP	If any questions arise, contact Syntech Systems, Inc.'s Customer Satisfaction Center (CSC) at 1-800-888-9136, ext. 2, or email support@myfuelmaster.com.

Document Version History

Version	Date	Description
1.0	6/01/2021	Original release
2.0	6/11/2021	Added part numbers for each assembly
3.0	6/13/2022	Modified to accommodate Gen 3 EAPros; removed Upgrade to Wifi Integration table.
4.0	8/26/2022	Updated Power On and Power OFF sequences, accounting for changes to Gen3 EAPro beep behavior.