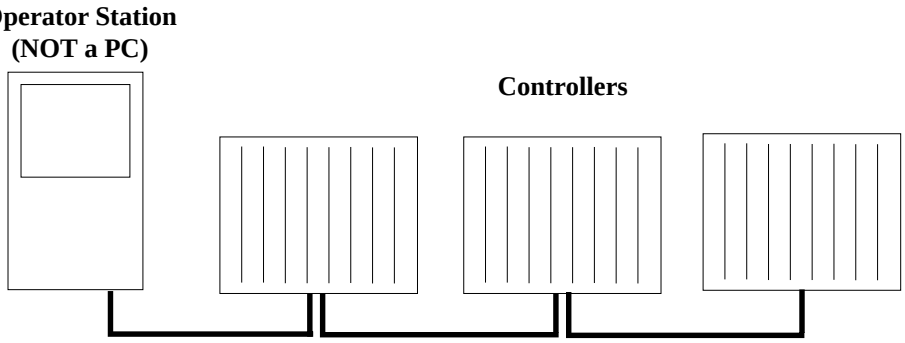
The "classic" MACO (Alpha) system. A variety of dedicated operator stations combined with 9, 12 or 16 slot controllers with multi-rack capability.

Uses MACO Optigrafix Screen Editor to create and edit screens.

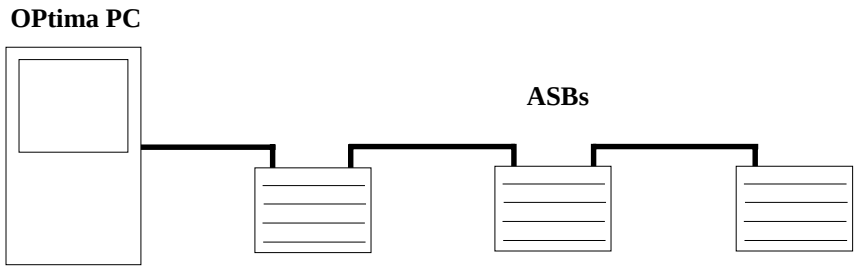
Uses MACO RLD Editor to create and edit logic.



The original (DS1) MACO DS system. An OPtima PC combined with multiple ASB's (Application Specific Blocks).

Uses Wonderware InTouch to create and edit screens.

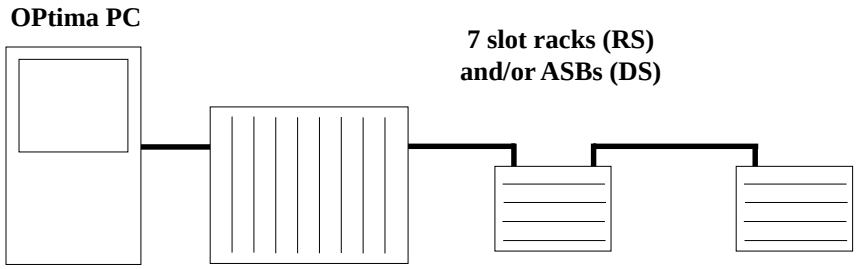
Uses Schneider Automation's Concept to create and edit logic.



The "enhanced" (DS1 or DS8) MACO DS/RS system. An OPtima PC or dedicated operator station combined with multiple ASB's or 7 slot racks (or both).

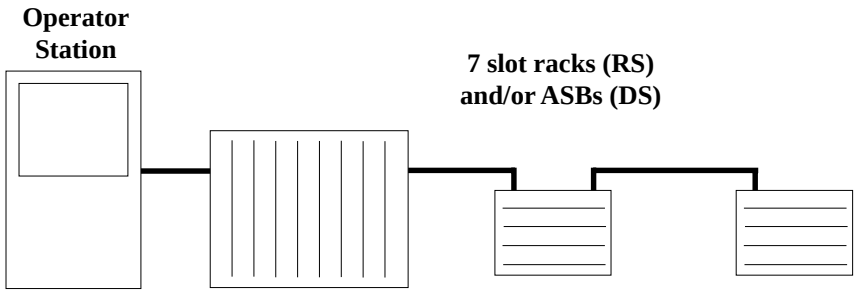
Uses Wonderware InTouch to create and edit screens.

Uses Schneider Automation's Concept to create and edit logic.

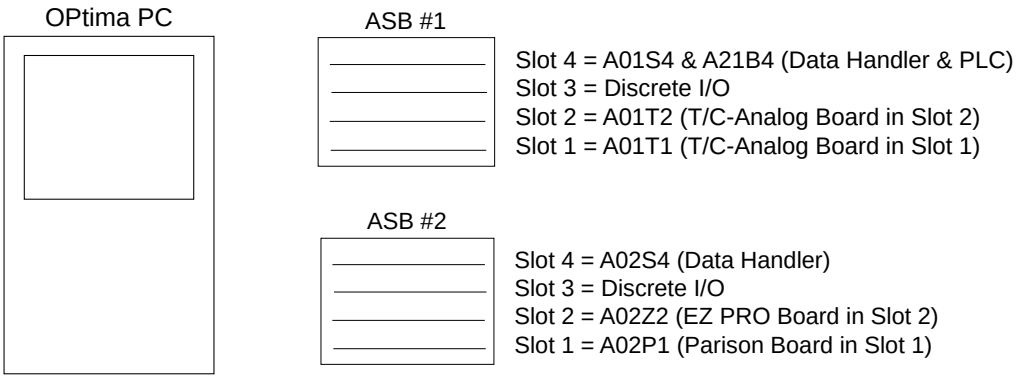


Uses MACO Optigrafix Screen Editor to create and edit screens.

Uses Schneider Automation's Concept to create and edit logic.

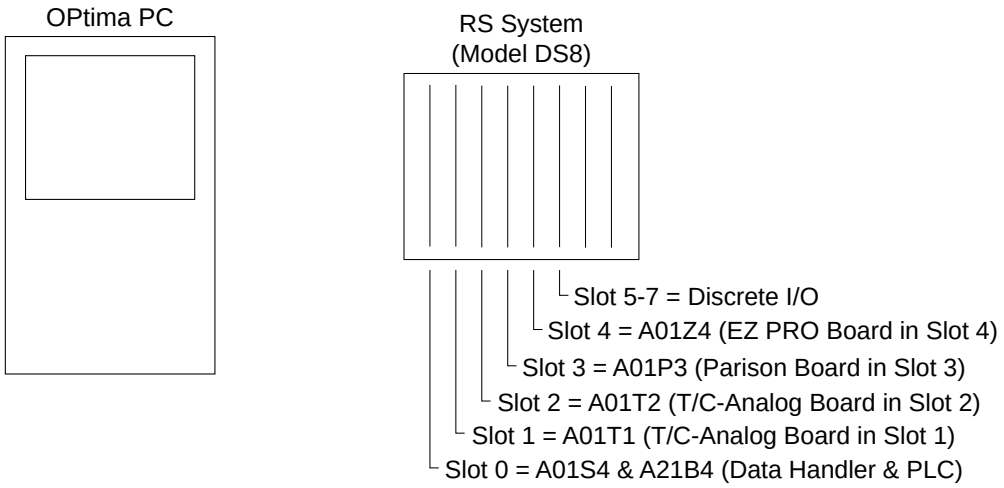


A DS1 system requiring two 12-zone T/C-Analog Cards, a Parison Card and an EZ PRO Card would be configured as shown below:



Note that ASB slots are numbered 1 to 4, top to bottom, respectively. Slots 1 and 2 are used for IPA's (Individual Processor Assemblies). Slot 3 is for I/O. Slot 4 is for the Data Handler and (optional) PLC.

A DS8 system with the same requirements would be configured as shown below:



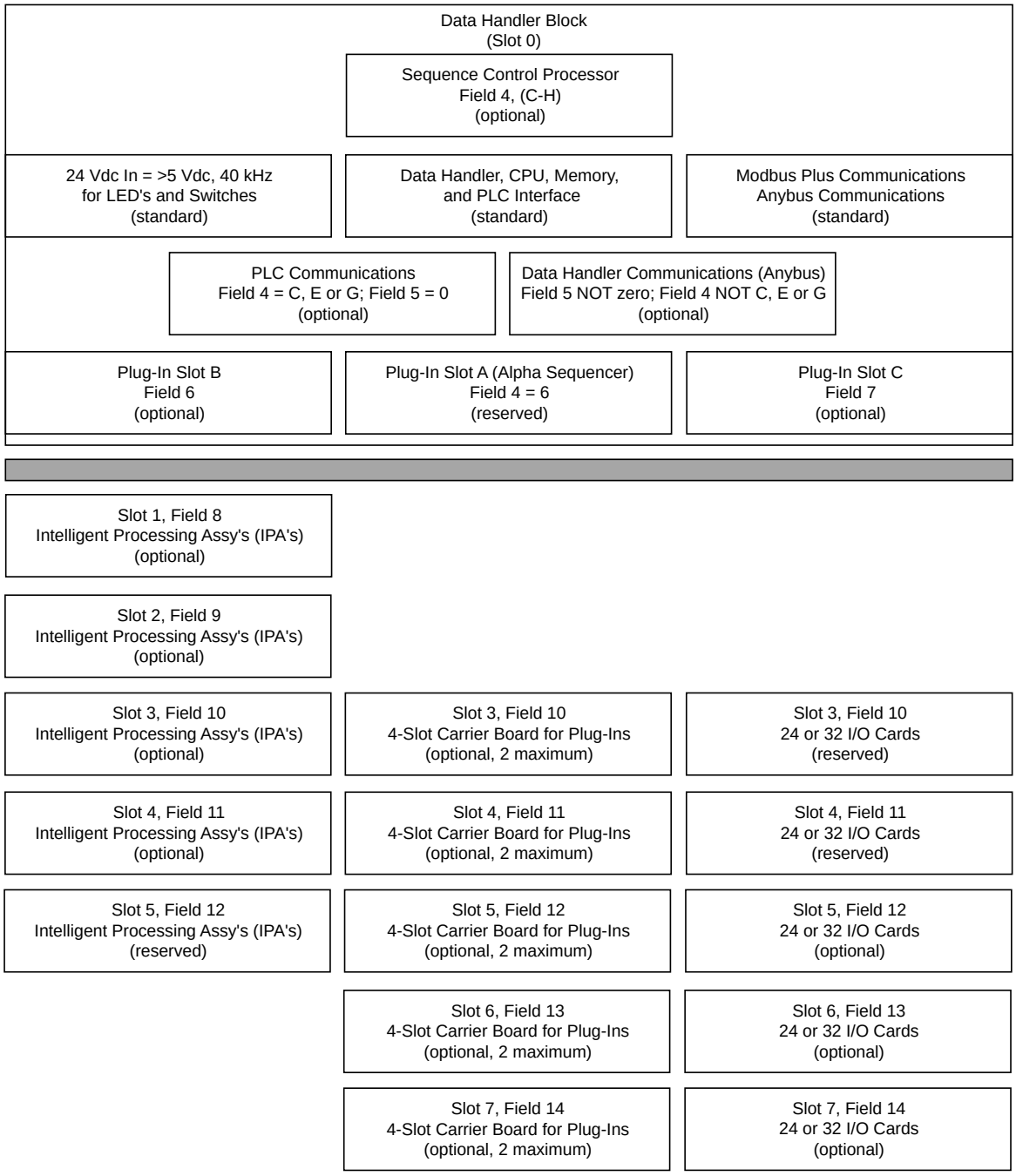
DS8 slots are numbered 0 to 7, left to right, respectively. Slot 0 is used for the Data Handler "block" – an assembly consisting of a Data Handler and (optional) PLC, and a 2-slot carrier board with (optional) sequence control. Slots 1 to 4 can be used for IPA's (with some rules applied - see below). Slots 3 to 7 can be used for I/O. Note that even though the Data Handler and PLC occupy Slot 0, their numbering designation (A01S4 and A21B4) is the same as in a DS1 system.

Rules:

1. Slots 1-4 can be T/C-Analog, maximum of 4 per rack.
2. Slots 2-4 can be Parison, EZ PRO, Injection or Extrusion, maximum of 2 per rack.
3. Slots 3-7 can be 32 I/O or 24 I/O Card assemblies.
4. Slots 3-7 can be 4-slot Carrier Boards, maximum of 2 Carrier Boards per rack.

MACO 8-Slot RS (Model DS8)

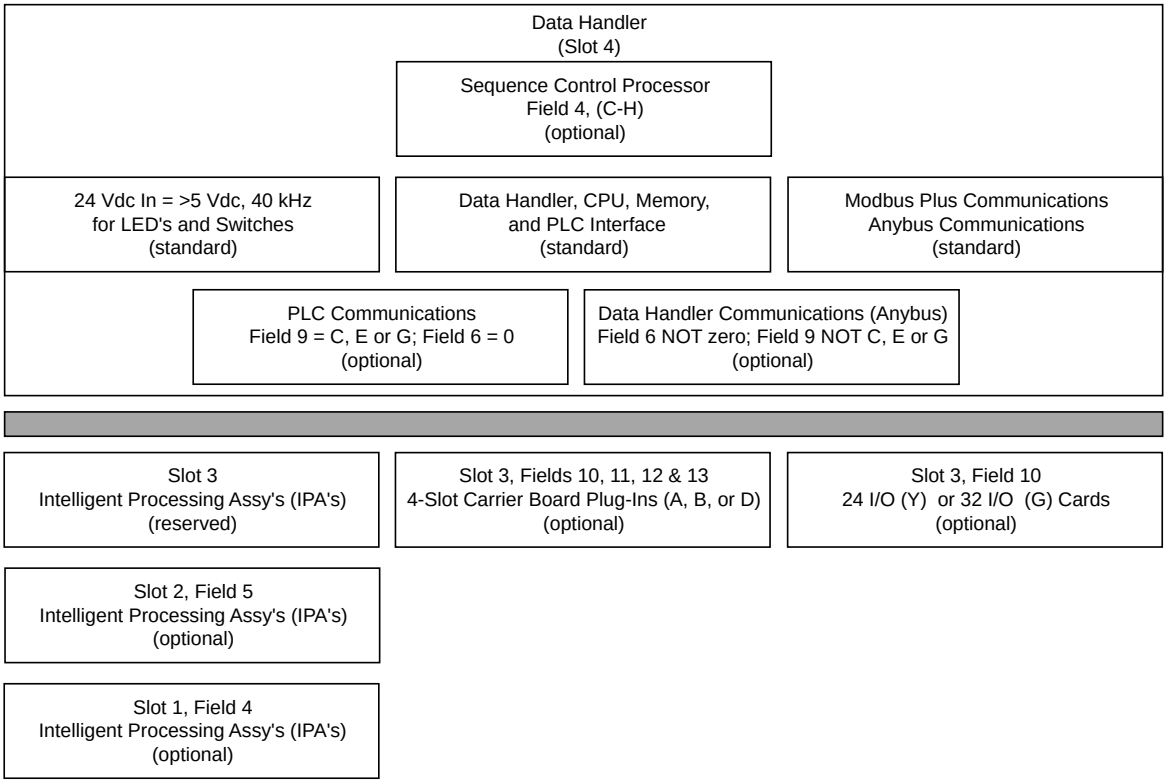
Base System: DS8 – Open 8-Slot Chassis, 24 Vdc Power Supply, Data Handler Block with Modbus Plus communications and 2 Plug-In Slots.



Data Handler	MBP Address = 16385 - 24576		
Slot 1 IPA	MBP Address = 40961 - 49152		
Slot 2 IPA	MBP Address = 32769 - 40960		
Slot 3 IPA	MBP Address = 24577 - 32768	DH I/O 1 - 32	addr: I = 17793, 17794; O = 16769, 16770
Slot 4 IPA	MBP Address = 49153 - 57344	DH I/O 33 - 64	addr: I = 17795, 17796; O = 16771, 16772
Slot 5 IPA	MBP Address = 57345 - 65535	DH I/O 65 - 96	addr: I = 17797, 17798; O = 16773, 16774
Slot 6		DH I/O 97 - 128	addr: I = 17799, 17800; O = 16775, 16776
Slot 7		DH I/O 129 - 160	addr: I = 17801, 17802; O = 16777, 16778

MACO ASB (Model DS1)

Base System: DS1 – Enclosure, Panel or DIN Rail Mount, 24 Vdc Power Supply, Data Handler with Modbus Plus communications and a 4-Slot Carrier board.



Note: Using Combination I/O in Slot 3 (Field 10) requires Fields 11, 12 and 13 to be set to zero.

Data Handler	MBP Address = 16385 - 24576	
Slot 1 IPA	MBP Address = 40961 - 49152	
Slot 2 IPA	MBP Address = 32769 - 40960	
Slot 3 IPA	MBP Address = 24577 - 32768	DH I/O 1 - 32 addr: I = 17793, 17794; O = 16769, 16770

General Statements regarding the DS1 (MACO DS ASB) and the DS8 (MACO RS)

1. The first four slots of the DS8 (MACO RS) provide the same functionality as a DS1 (ASB).

2. The Data Handler Block in a DS8 provides two plug-in slots (B and C). Plug-in Slot A is reserved for an Alpha Type Sequencer that is not available in a DS1.

3. If both Racks and ASB's are to be utilized in the same system, Node 1 should be an RS Rack.

4. When utilizing the MACO-Net Display Communication assembly it should be placed in Node 1.

5. When utilizing the MACO-Net Display Communication assembly in an ASB it will reside in Slot 3-D (this permits contiguous I/O numbering, starting with the first input or output).

6. When utilizing the MACO-Net Display Communication assembly in an RS system the assembly should reside in Slot C of the Data Handler block. It may function in Slot B of the Data Handler block or Slot 3-D but we are *recommending* only the one slot.

7. On the Data Handler, Switch 8 of switch bank 1 (originally reserved for the Modbus address) is "off" to indicate an ASB and "on" to indicate an RS (the major reason for the switch is that the Data Handler shows as Slot 4 in an ASB and Slot 0 in an RS). The Data Handler also uses this switch to determine which slots need to be searched on power-up for building module information.

8. If the configuration file loaded in the Data Handler is generated by Optigrafix, the addressed items are stored in sorted order and the "screen_con.obj" currently contains all setpoints and values used in the application (basically this is the same as the "screen.cfg"). To eliminate possible duplications (Modbus Plus doesn't permit function types - slots only), you must purge the application and then link. The file format utilizes Optigrafix ID's that are converted by the Data Handler to Modbus Plus ID's.

9. If the configuration file loaded in the Data Handler isn't generated by Optigrafix, it is not sorted and the file will indicate V10 and "Config Creator". This format is intended for when Optigrafix is not used. The Data Handler will use the ID's directly (the file has the Modbus Plus ID format). In applications where Optigrafix is used (as with the 41AC display) the Data Handler with the MACO-Net Display Communications must have the Optigrafix generated file loaded. The other Data Handlers in the system will use the default configuration files generated for Wonderware-only applications.

10. The 1M Sequence Memory Map should be used for all new projects. This memory map will also work with the 512K processor *and it is mandatory for utilization of the 41AC display*.

11. Make certain that assemblies with the Linegraph function (Parison, EZ-Pro and Injection) have their board number set correctly. Failure to do this will prevent linegraphs from functioning.

The MACO DS with 41AC compared to the MACO Alpha Platform

1. Overview of Communications in the MACO DS with 41AC:

- The Display runs in single chassis mode.
- Display Switch S2, Position 3 is “Open” for MACO Alpha; “Closed” for MACO DS/RS. Display Configuration screen will display a message when in DS/RS mode.
- The Display Handler (MACO-Net Display Processor) is polled every 10 msecs by the Data Handler.
- Communications has been changed to utilize multiple data packets (up to 13). This provides the capability of improving data displayed by a factor of 13. The communication processor in the display reviews the list of items to be updated and reduces the number of parameters requested (thus providing even faster updates).
- The Primary Data Handler has a set of rules for determining if the ID is local (in its ASB/rack) or remote.
- By convention, the Data Handler with the MACO-Net RS-485 processor should be Modbus Node 1 (because it considers itself Rack 1 from the Optigrafix definition). While it may be possible to use a different node address for the Data Handler with the MACO-Net card it is *NOT* recommended!
- Machine Function Keys (and switches on the display) are mapped to PLC 1 (Node 21). Node 21 must be used for the first PLC. The Data Handler treats momentary switches, toggle switches and selector switches in a manner similar to Alpha platform. When a switch is activated, the Data Handler writes the appropriate status to the PLC.

The MACO DS with 41AC compared to the MACO Alpha Platform (continued)

2. Similar Data Handler Functionality:

- Operator CRS (96 Toggle, 64 Toggle Setup, 64 Momentary, eight 4-Position Selector Switches, eight 4-Position Setup Selector Switches) are available. Additionally, there are 32 Operator CRs reserved for Toggles and twenty-eight 16-Position Selector Switches defined but not utilized. This range of addresses is the same as the 512k Memory Map, *but the order of CRs within each word is increasing rather than decreasing!*

- Data Handler Setpoints are available for storing other Toggle CR's and Selector Switches.

- Recipe Functionality (Insta-Set and Recipe):
    - Internal to Active
    - Floppy to Active
    - Cartridge to Active
    - Active to Cartridge
    - Active to Floppy
    - Active to Internal
    - Cartridge to Floppy

- Statistical Process Control (SPC)
    - Same viewing functionality but only the first 24 parameters have CR triggers
    - Currently reviewing differences compared to the Optima PC version
    - Trending has the same functionality

- Linegraphs
    - Same functionality as Alpha
    - Program selection made using Optigrafix

- Parison Profiles
    - Same functionality as Alpha
    - Program selection made using Optigrafix

- LED Indicators
    - Data Handler Enunciators
    - Operator Station Machine Function LED's use Data Handler words 17025 and 17026 (1-16 in 17025; 17-24 in the first 8 bits of 17026). Update using MSTR or Global (these are *NOT* pre-located in the PLC memory map).

- Vectors
    - Same functionality as the Alpha
    - Addresses are the upper 8 bits of Data Handler word 17026. Update using MSTR or Global (these are *NOT* pre-located in the PLC memory map).

The MACO DS with 41AC compared to the MACO Alpha Platform (continued)

3. Different Data Handler Functionality:

- Printing Function
    - No printing from the Data Handler
    - MACOVIEW can be used for screen captures

- Statistical Process Control (SPC)
    - No printing of data
    - Logger required on PC for gathering SPC data and providing method of printing (in testing/verification)

- Math
    - 41AC: Tasklist or PLC
    - Optima PC: Wonderware or PLC
    - Alpha: Data Handler (Optigrfix)

- Combination I/O Assemblies
    - Input locations in Data Handler
    - Output locations in Data Handler
    - Output Status CR’s (follow the 32 Inputs on the card)
    - Output Status’s not sent to PLC (typically for display usage)
    - Must be put in generic location (not currently mapped in Data Handler)

- Tasklist (in Data Handler)
    - Create Global Data
    - Consume Global Data
    - Read I/O
    - Write I/O
    - Generic Tasks
    - Number of Interrupts

Wonderware Programming vs Optigrafix Programming

- Wonderware uses Scripting
- Wonderware Separates Control and Display
- Optigrafix is currently limited to Modbus Plus devices
- PC vs. Dedicated Platform
- Printing (MACOVIEW required for 41AC)
- Visibility
- Security
- Machine Function Keys
- Decimal Point Locations
- Timers have 1msec vs. 10msec resolution

Useful ID's:

418442	System Health Setpoint (System_Health_Stpt)
418465	ASB Fault Behavior Setpoint (ASB_Fault_Behavior)
420481	Maximum Time (Scan_Count)
420482 - 420486	Typical Time (Reserved_Value_02 through Reserved_Value_06)
417025 & 417026	(First 24 are LEDs, last 8 are Vectors)
418466	Poke 99 and then enter 99 on delete in screen to initialize memory for recipes

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