Cerner Interface Definition.

This document describes the interface capabilities between the Cerner LIS system to EpiCenter.

The document is divided into 6 main sections

- **Demographic Download Capabilities:** this describes the actually download capabilities in more detail, specifying what fields are supported and any known issues or workflows that require special consideration.
- **Result Capabilities:** This describes the ability of the driver to support result upload and posting and which
- **Physical Architecture:** This section described the physical and low level mechanism for connecting the systems, and where relevant what tools can be used to test the low level communication is working.
- **LIS Driver:** This provides an overview of how the driver is installed and configured in the LIS system. It provides an insight into what is required in order to get the interface operational.
- **Expected Timelines:** This section gives an estimate of the ideal timeline required to install, configure and test this interface.
- **Driver Ordering Process:** This section describes the process and responsibilities for ordering this interface.

Physical Architecture

Term Server:
The serial connection from the EpiCenter is converted from 9-pin serial to CAT5 network cable using a 9-pin serial to RJ45 converted attached to the serial port of the EpiCenter. The CAT5 network cable is connected to a port on the terminal server. The terminal server typically has a number of input ports for connecting multiple serial devices. This port must be enabled for communication by logging on to the term server and using the onboard configuration software to achieve this
The single output or network port on the term server connects to the Cerner server over standard TCP/IP. ✓

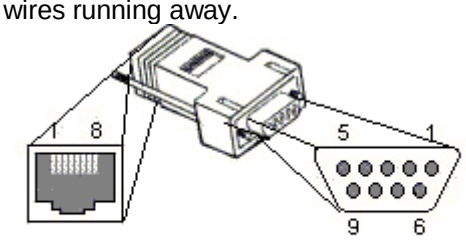
Known Term Servers Supported

- Xyplex

Serial to RJ45 Wiring.
The wiring of the 9-pin serial to RJ45 converter is typically terminal server dependant. The wiring for the Xyplex term server is defined below.

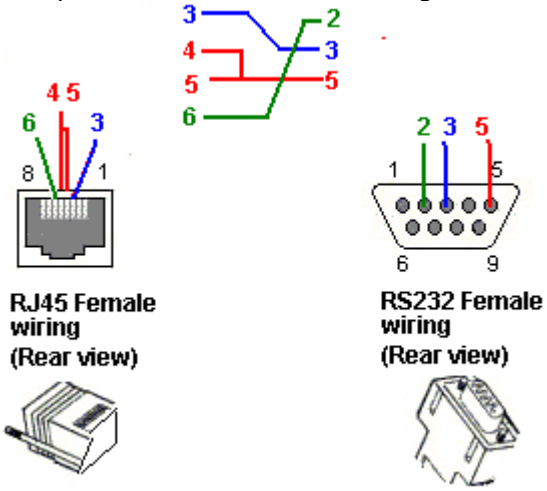
Standard RJ45 to 9-pin RS232 per Xyplex documentation
This connector only connects three pins on the serial side to 3 pins on the RJ45 side. Two pins on the RJ45 side are bridged. Please note the wire colors in the explanation are example only to easily differentiate the diagram. They will probably not be the same as your connectors so you need to do this based on pin count. Pins not mentioned below can be left disconnected.

The first diagram shows the view from the front/outside of each side of the connector with the wires running away.



RJ45 Female (Front view) **RS232 Female (Front view)**

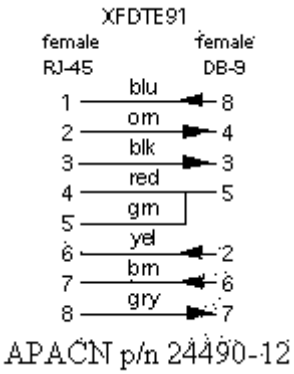
The second diagram is of the same connector, but from the inside viewpoint of the connector with wires facing towards you. Use this for pin counting to identify the correct pictures. On the RJ45 side, pins 4 & 5 must be soldered together and joined to the single pin 5 on the RS232 side.



RJ45 Female wiring (Rear view) **RS232 Female wiring (Rear view)**

RJ45 to 9-pin RS232 per Xyplex documentation

I have no reason to doubt the previous ones will work, as EpiCenter is only making use of the three pins described. However, I found another pin diagram where all the ancillary wiring is connected between the two sides of the connector. If the first one does not work you can try this too. I believe the XFDTE91 code is actually a catalogue number for ordering the connector from Xyplex.



Physical Communication Logging

The logging of physical communication is possible for both incoming and outgoing streams. Logging can typically only be seen by the Cerner MDI with access to the backend.

The log displayed in the interface can be exported to text file. The same log file is used for both incoming and outgoing queues to the LIS.
The log displays both communication control characters with date and timestamps, as well as the logical message content within the low level frames. The log also contains comments relevant to processing states in the Cerner system, such as available data fields. ✓

Each interface has its own log file created, created new every regular interval.

Cerner Classic Driver

Steps to getting Cerner Classic Interface Installed and Configured:

Installation

- Customer must request an arrangement letter from Cerner (quote for pricing)
  - Please specify for **EpiCenter Multiplexor** driver when requesting
    - There is a different interface for Phoenix only and another one for regular Phoenix/EpiCenter that differs from the Multiplexor you should request.

- Customer has two options once they receive the arrangement letter
  - Send electronically to Roger who will submit PO for purchase
  - Submit to Cerner directly in which case will need to acquire BD PO number from Roger

- In the arrangement letter a principal Cerner contact name and number are provided
  - Customer and BD representative should contact that person with questions during configuration.

- Customer will communicate with Cerner contact for the installation of the driver

Configuration

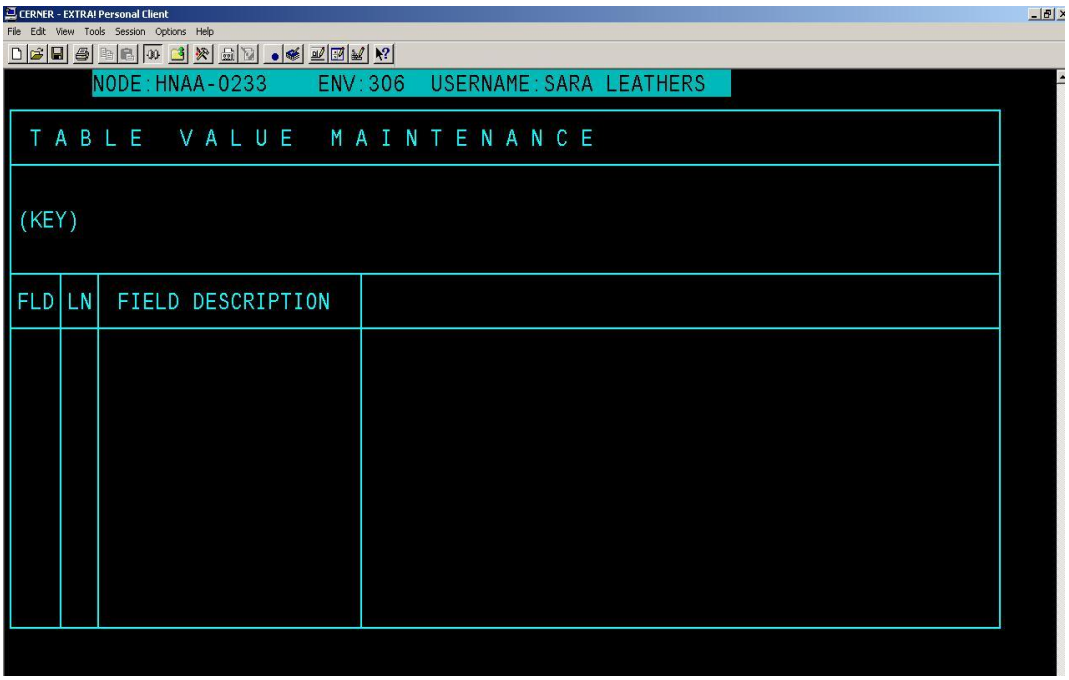
- Make sure you are using a REV level greater than 120 when the driver is loaded
  - If you are below REV 120, you can request PIM 36789/ from Cerner to be added in order to proceed.

- Some basic configuration should already be done upon installation of the driver based on known settings for this interface. (See sample table for example)

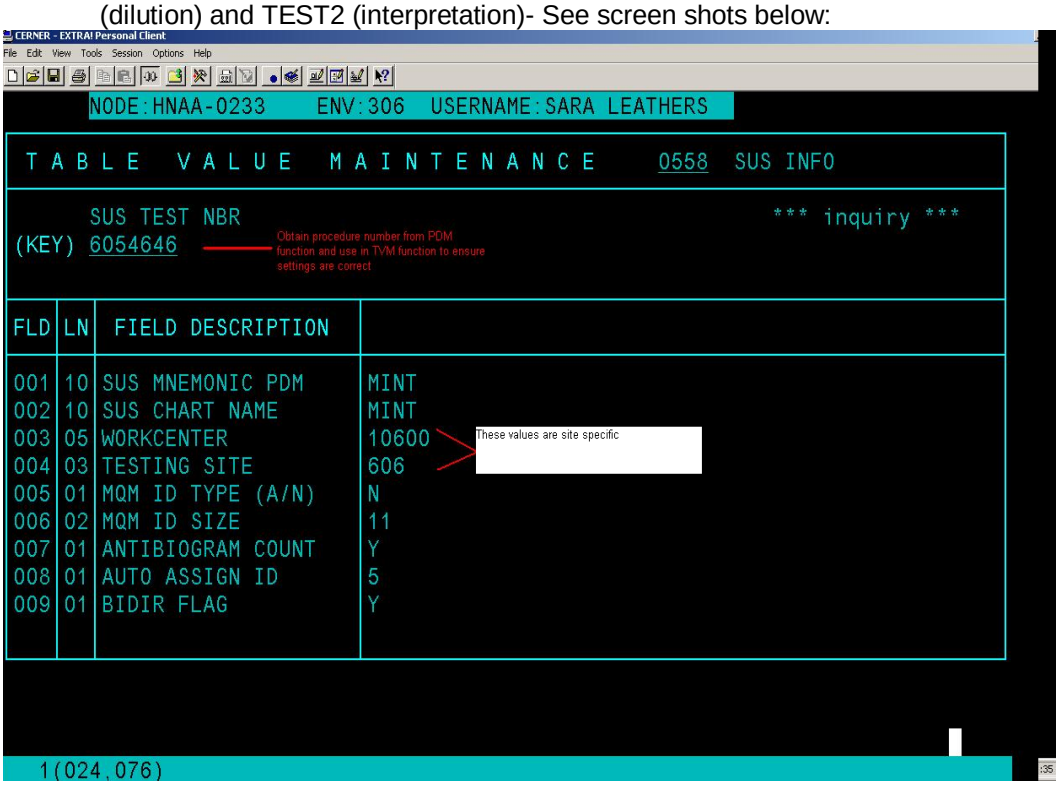
  - Some modifications to the 9915 table (seen above) will most likely be needed.
    - Those can be determined by the Cerner contact or documentation sent by Cerner for the interface

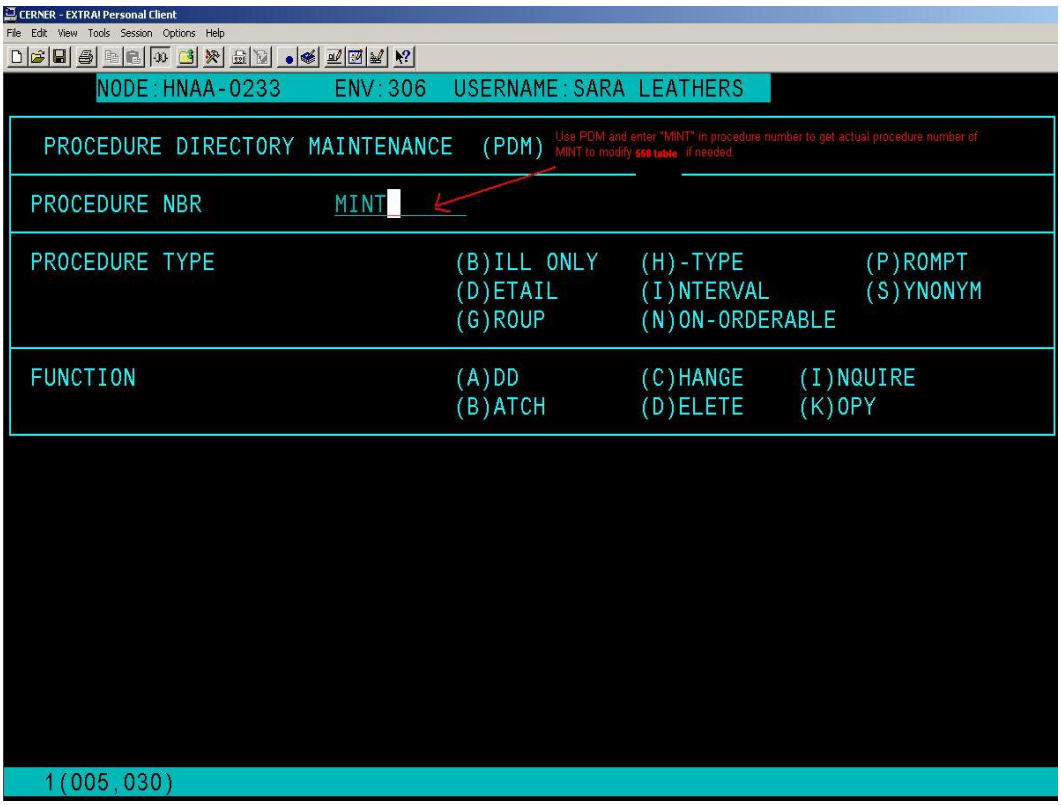
- If Vitek was interfaced previously have the Cerner contact turn **off** the flag that appends a “V” to every dilution value.
  - If the flag is left on in the **MNM** function a value will need to be built for every number preceded by a “V” and you will run out of space

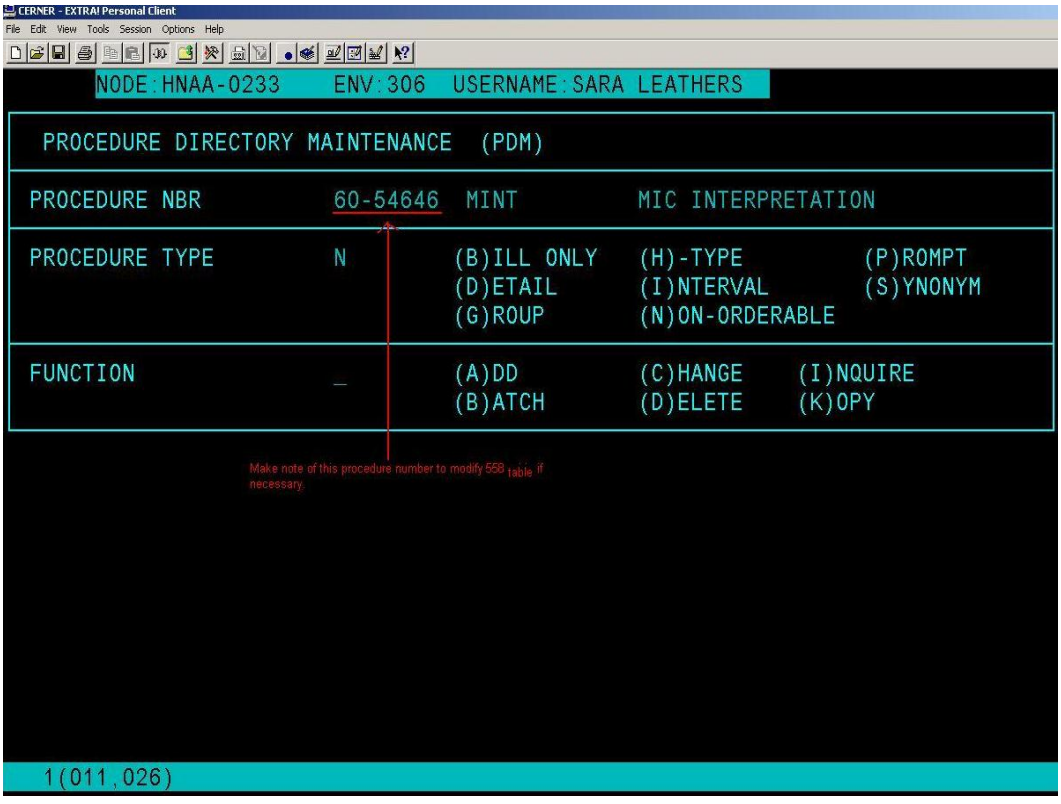
- Configure the group procedure for Dilution and Interpretation (the 558 table)
  - Use the function TVM to modify the 558 table

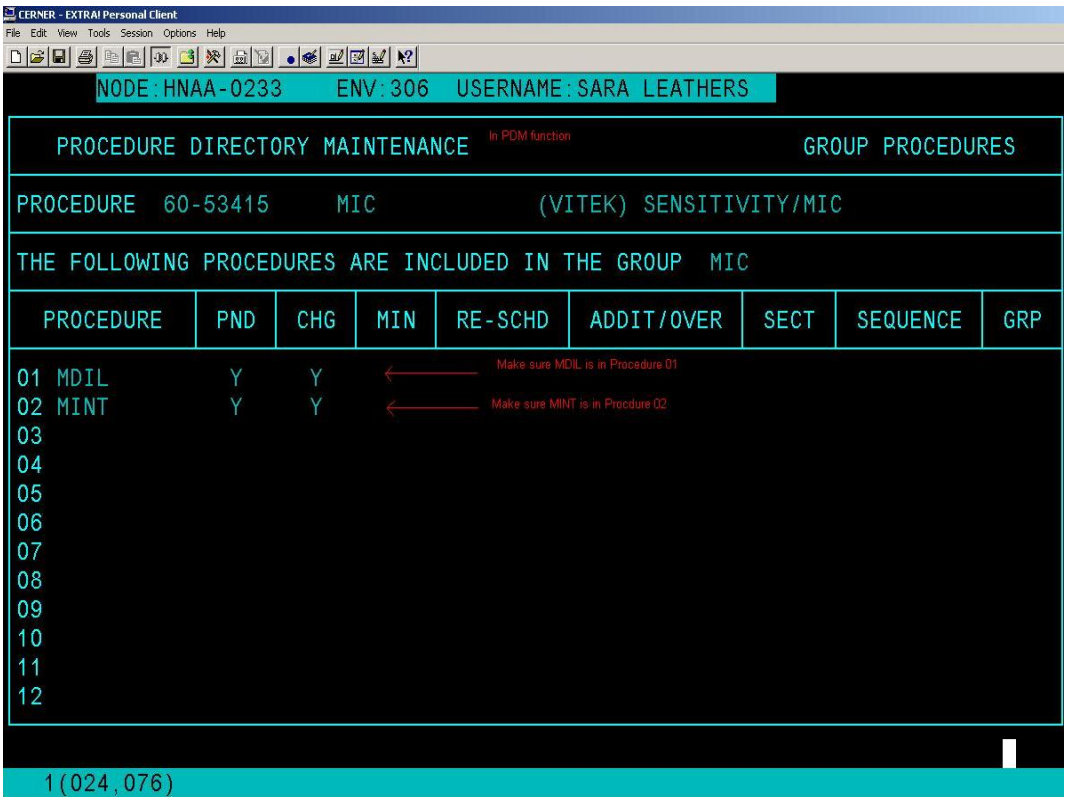


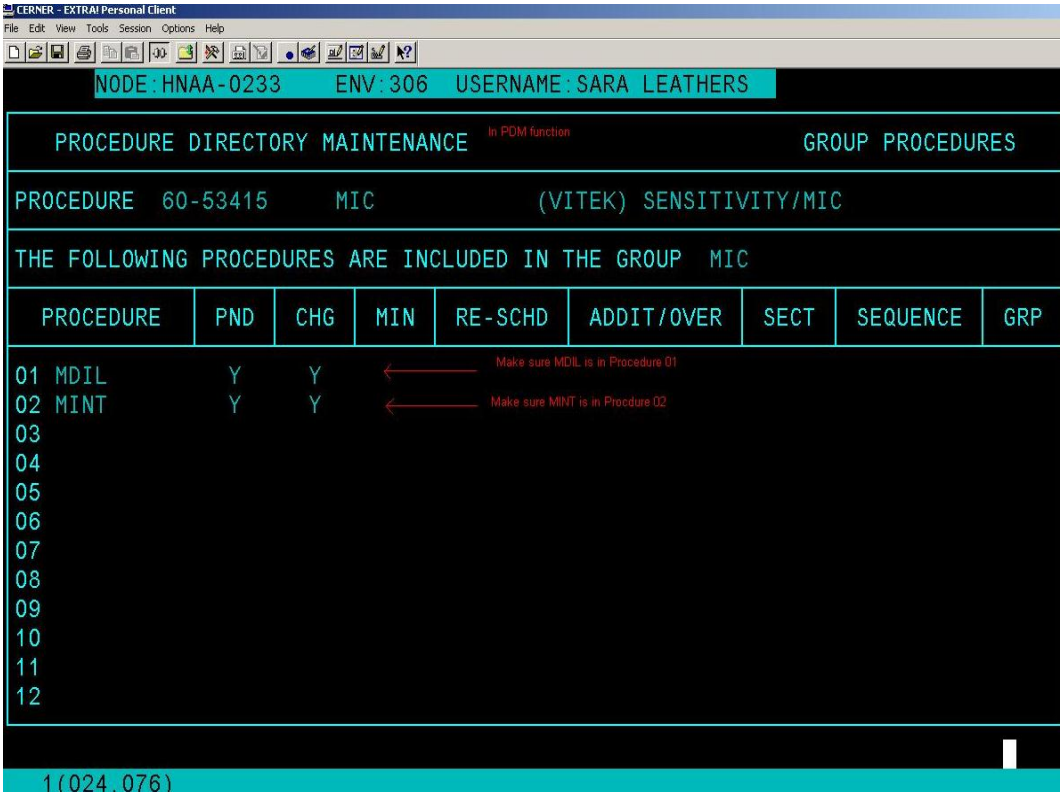
- Use the function PDM to modify MINT and MDIL components as needed.
  - If more than one type of AST instrument is present you will need two different MIC group procedures
- Existing in the group procedure usually called “MIC” are two components “Dilution and Interpretation”. Make sure these two components are in the PDM function as TEST1 (dilution) and TEST2 (interpretation)- See screen shots below:



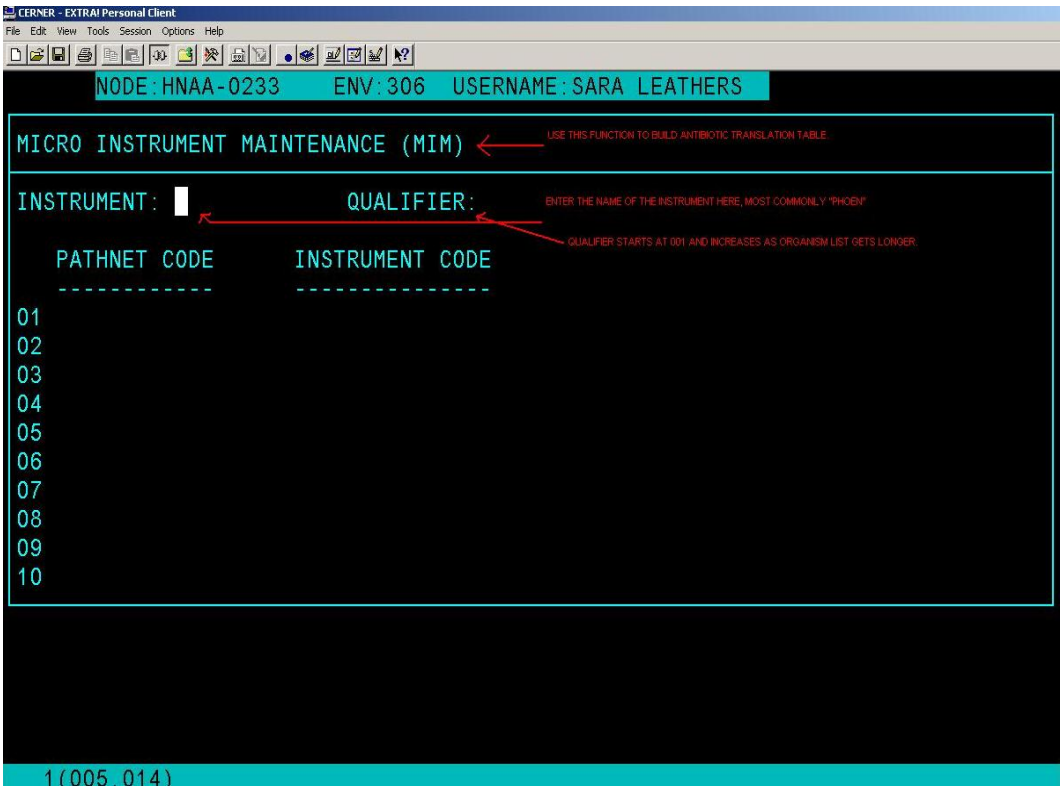

CERNER - EXTRA! Personal Client
File Edit View Tools Session Options Help
NODE:HNAA-0233 ENV:306 USERNAME:SARA LEATHERS
PROCEDURE DIRECTORY MAINTENANCE (PDM)
Use PDM and enter "MINT" in procedure number to get actual procedure number of MINT to modify 558 table if needed.
PROCEDURE NBR MINT
PROCEDURE TYPE
(B)ILL ONLY
(H)-TYPE
(P)ROMPT
(D)ETAIL
(I)NTERVAL
(S)YNONYM
(G)ROUP
(N)ON-ORDERABLE
FUNCTION
(A)DD
(C)HANGE
(I)NQUIRE
(B)ATCH
(D)ELETE
(K)OPY
1(005,030)

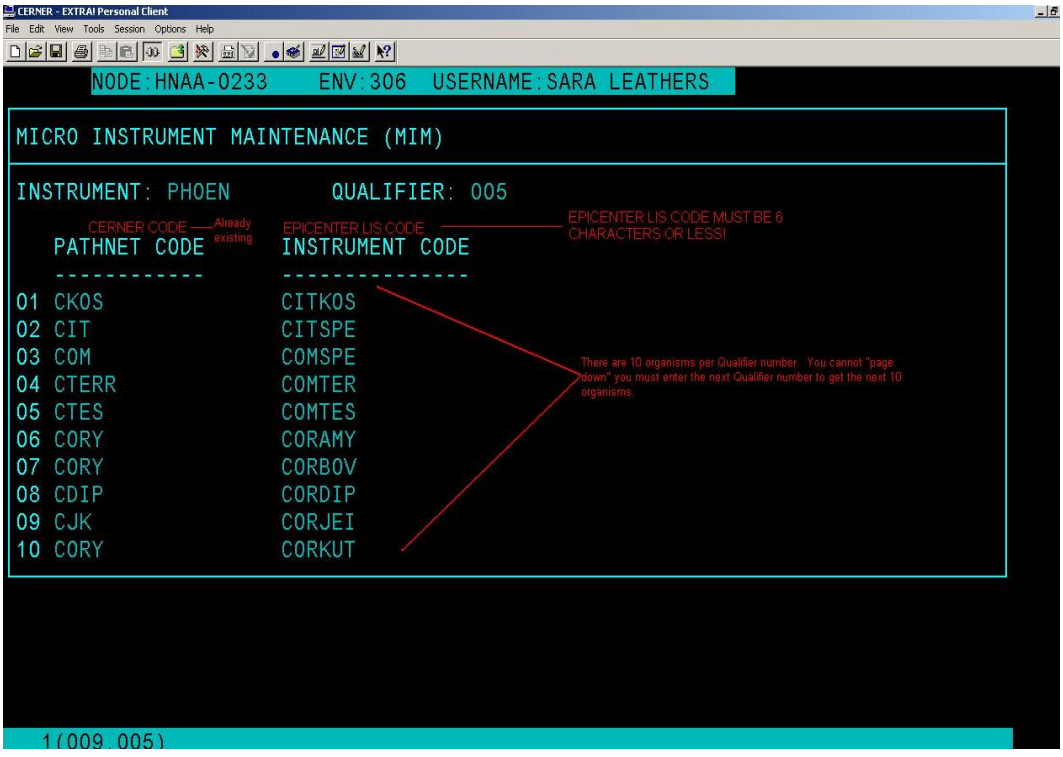

CERNER - EXTRA! Personal Client
File Edit View Tools Session Options Help
NODE:HNAA-0233 ENV:306 USERNAME:SARA LEATHERS
PROCEDURE DIRECTORY MAINTENANCE (PDM)
PROCEDURE NBR 60-54646 MINT MIC INTERPRETATION
PROCEDURE TYPE N
(B)ILL ONLY
(H)-TYPE
(P)ROMPT
(D)ETAIL
(I)NTERVAL
(S)YNONYM
(G)ROUP
(N)ON-ORDERABLE
FUNCTION
(A)DD
(C)HANGE
(I)NQUIRE
(B)ATCH
(D)ELETE
(K)OPY
Make note of this procedure number to modify 558 table if necessary.
1(011,026)

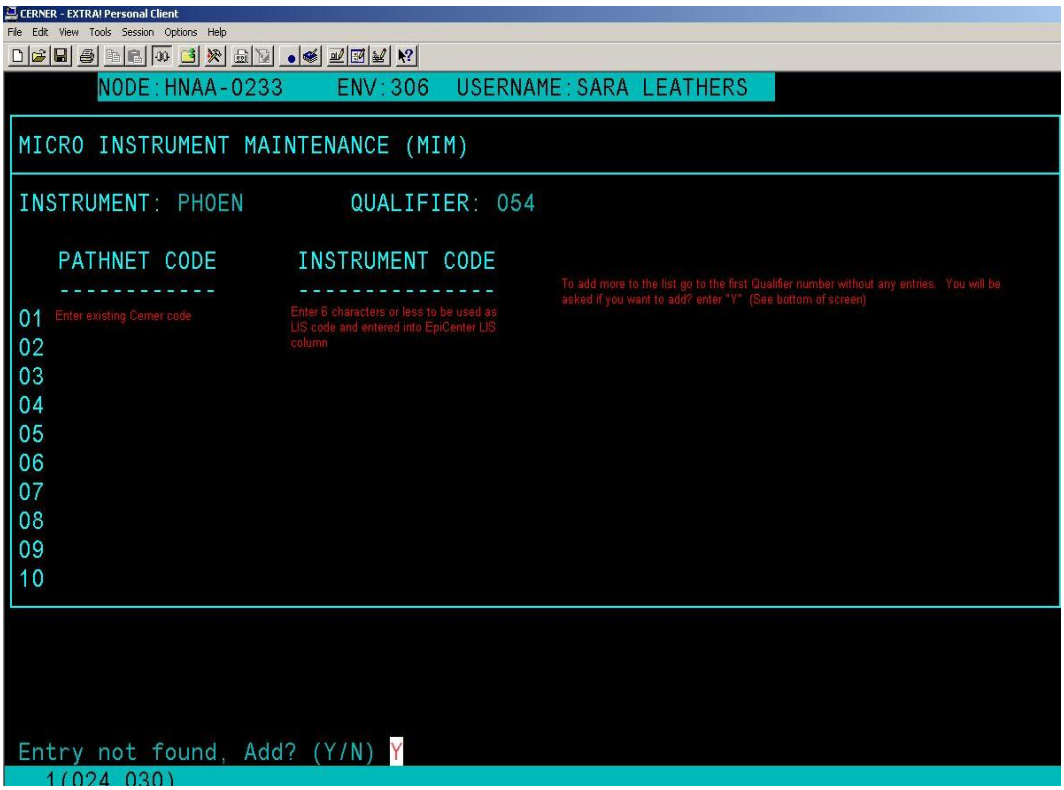




- You do **NOT** need to configure the 448 Table
  - Instead you must use the function MIM to build a translation table for the organisms
  -

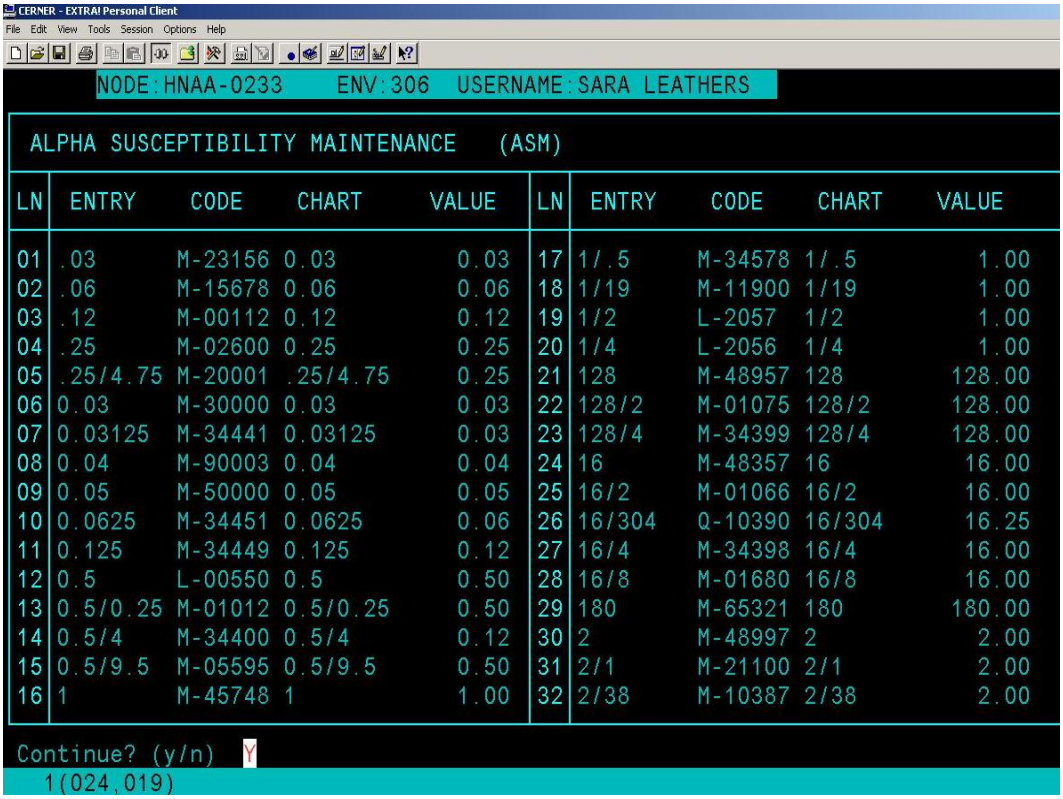

CERNER - EXTRA! Personal Client
File Edit View Tools Session Options Help
NODE:HNAA-0233 ENV:306 USERNAME:SARA LEATHERS
MICRO INSTRUMENT MAINTENANCE (MIM)
USE THIS FUNCTION TO BUILD ANTIBIOTIC TRANSLATION TABLE
INSTRUMENT:
QUALIFIER:
ENTER THE NAME OF THE INSTRUMENT HERE, MOST COMMONLY "PHOEN"
QUALIFIER STARTS AT 001 AND INCREASES AS ORGANISM LIST GETS LONGER.
PATHNET CODE
INSTRUMENT CODE
01
02
03
04
05
06
07
08
09
10
1(005 014)


CERNER - EXTRA! Personal Client
File Edit View Tools Session Options Help
NODE:HNAA-0233 ENV:306 USERNAME:SARA LEATHERS
MICRO INSTRUMENT MAINTENANCE (MIM)
INSTRUMENT: PHOEN
QUALIFIER: 005
CERNER CODE — Already existing
EPICENTER LIS CODE
EPICENTER LIS CODE MUST BE 6 CHARACTERS OR LESS!
PATHNET CODE
INSTRUMENT CODE
01 CKOS CITKOS
02 CIT CITSPE
03 COM COMSPE
04 CTERR COMTER
05 CTES COMTES
06 CORY CORAMY
07 CORY CORBOV
08 CDIP CORDIP
09 CJK CORJEI
10 CORY CORKUT
There are 10 organisms per Qualifier number. You cannot "page down" you must enter the next Qualifier number to get the next 10 organisms.
1(009 005)

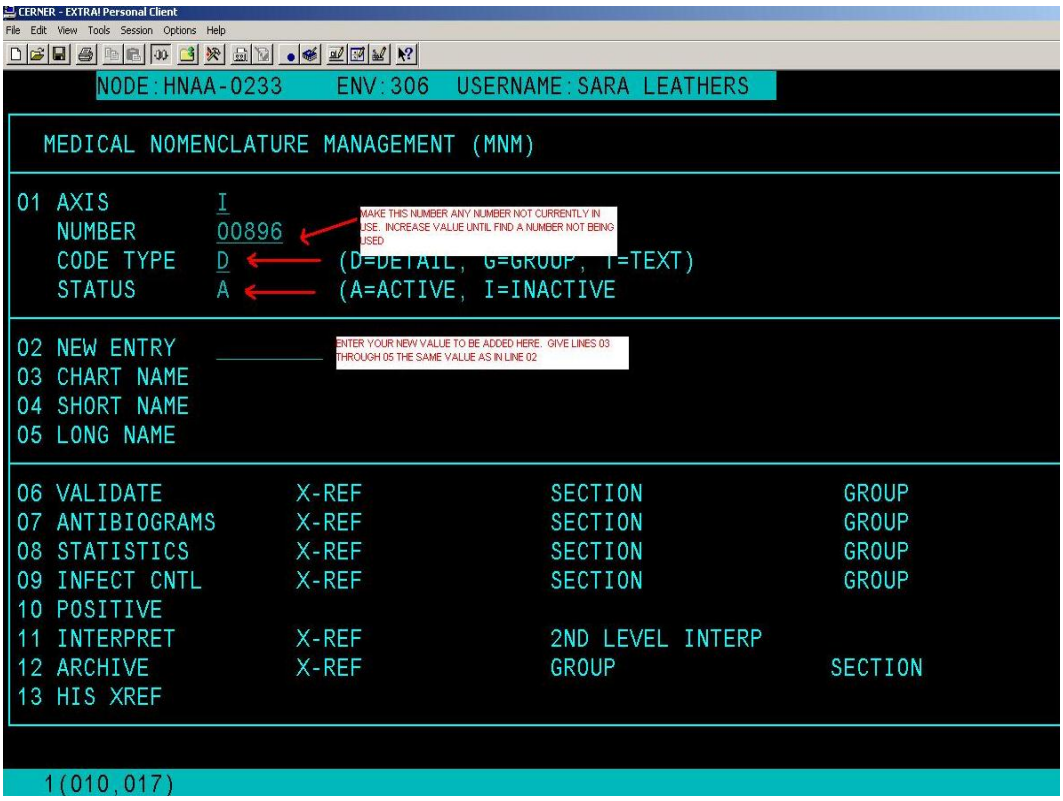


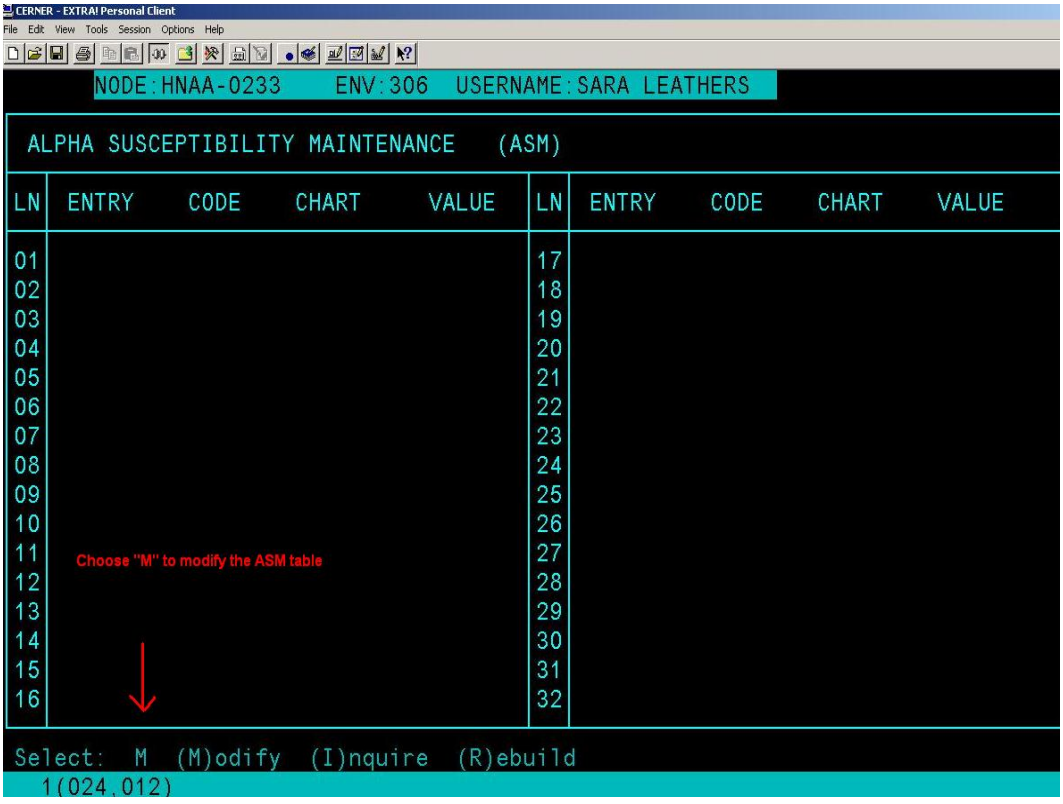
- Keep in mind there are several organism IDs. It is best to take about 10-20 and build them in the test environment as you will need to rebuild them in the Live environment once testing is complete.

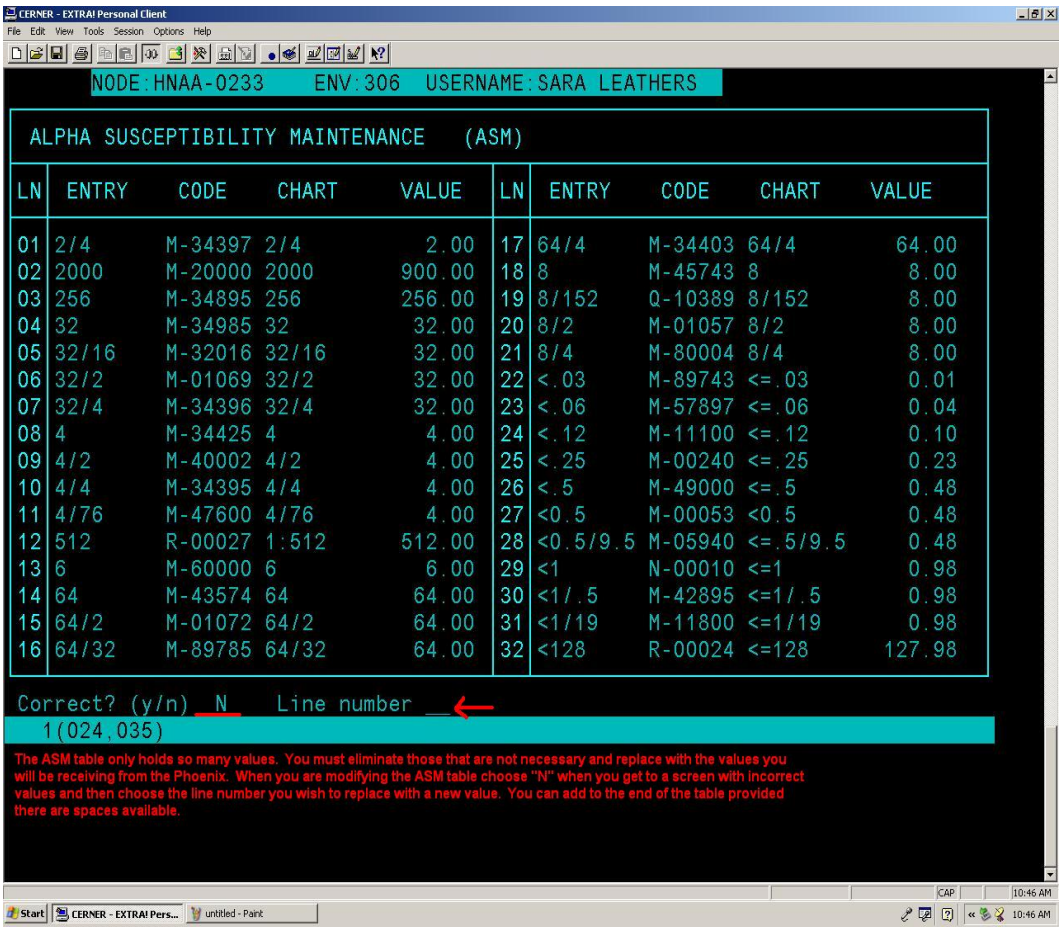
➢ Check the **ASM** Table –



- For each MIC dilution possibly received from the Phoenix, if no value exists in **ASM** table, the value must first be built in **MNM** and then added to the **ASM** table


CERNER - EXTRA! Personal Client
File Edit View Tools Session Options Help
NODE:HNAA-0233 ENV:306 USERNAME:SARA LEATHERS
MEDICAL NOMENCLATURE MANAGEMENT (MNM)
01 AXIS I
NUMBER 00896
CODE TYPE D (D=DETAIL, G=GROUP, T=TEXT)
STATUS A (A=ACTIVE, I=INACTIVE
MAKE THIS NUMBER ANY NUMBER NOT CURRENTLY IN USE. INCREASE VALUE UNTIL FIND A NUMBER NOT BEING USED
02 NEW ENTRY
03 CHART NAME
04 SHORT NAME
05 LONG NAME
ENTER YOUR NEW VALUE TO BE ADDED HERE. GIVE LINES 03 THROUGH 05 THE SAME VALUE AS IN LINE 02
06 VALIDATE X-REF SECTION GROUP
07 ANTIBIOGRAMS X-REF SECTION GROUP
08 STATISTICS X-REF SECTION GROUP
09 INFECT CNTL X-REF SECTION GROUP
10 POSITIVE
11 INTERPRET X-REF 2ND LEVEL INTERP
12 ARCHIVE X-REF GROUP SECTION
13 HIS XREF
1(010,017)

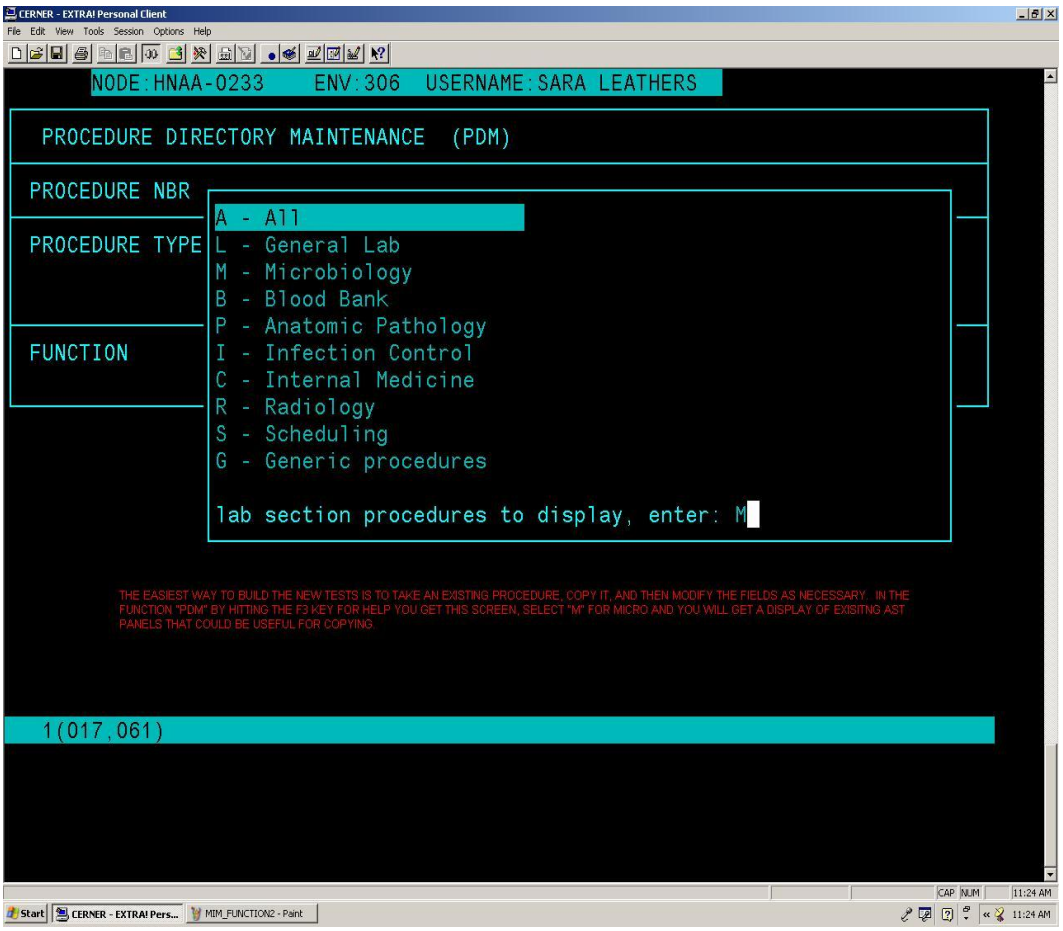

CERNER - EXTRA! Personal Client
File Edit View Tools Session Options Help
NODE:HNAA-0233 ENV:306 USERNAME:SARA LEATHERS
ALPHA SUSCEPTIBILITY MAINTENANCE (ASM)
LN ENTRY CODE CHART VALUE LN ENTRY CODE CHART VALUE
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
Choose "M" to modify the ASM table
Select: M (M)odify (I)nquire (R)ebuild
1(024,012)

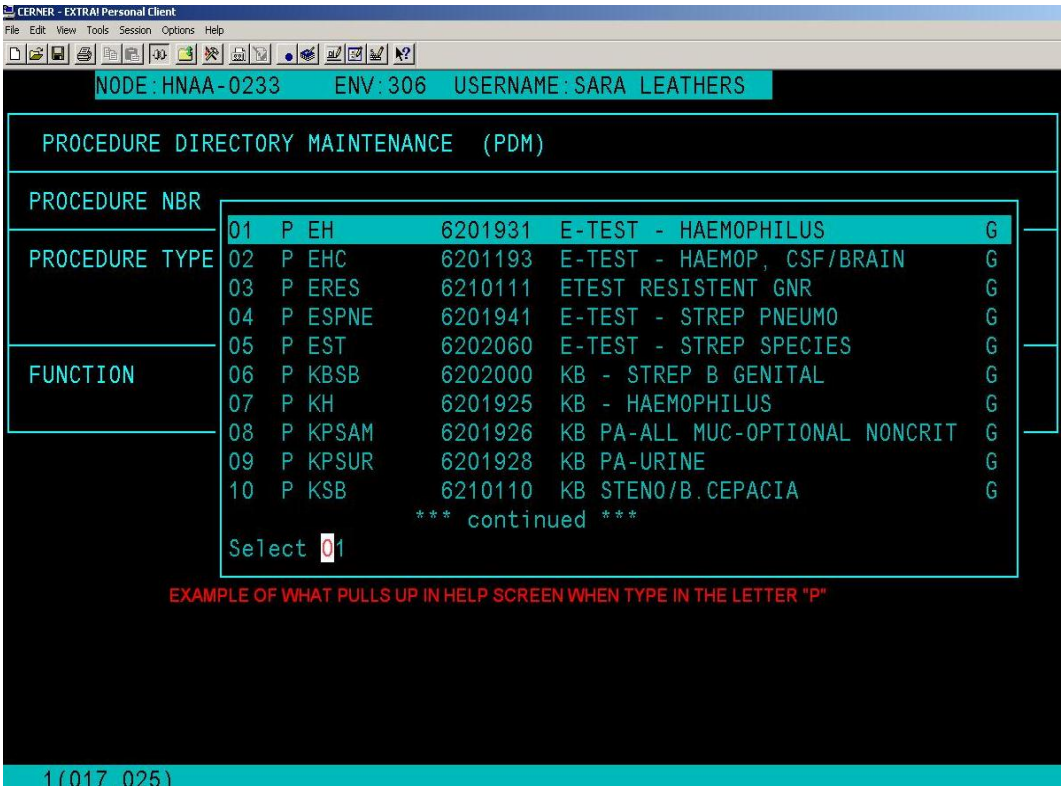


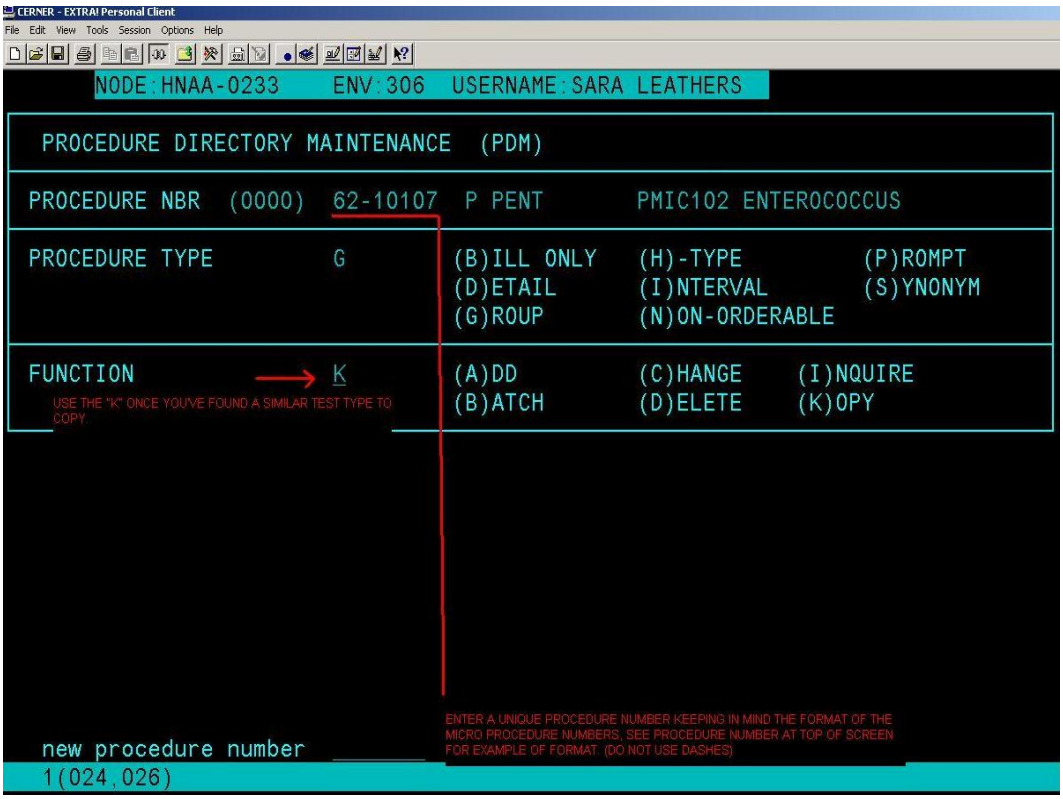
- Previous Vitek users will notice the need to add/modify many values due to the doubling dilutions of Phoenix vs. the extrapolated MIC from Vitek.

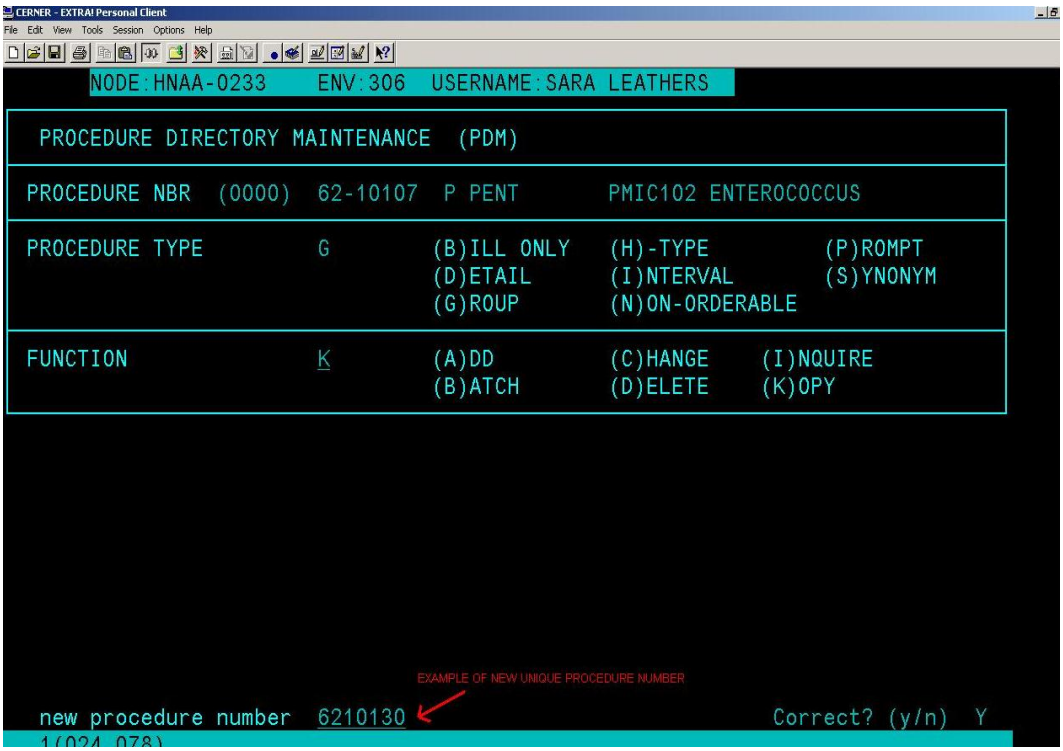
I

- Build MIC panels to be used
  - You must build the panel template in Cerner for each different type of panel to be used by the account
    - The easiest way to build a panel is to Copy “K” an existing panel in Cerner

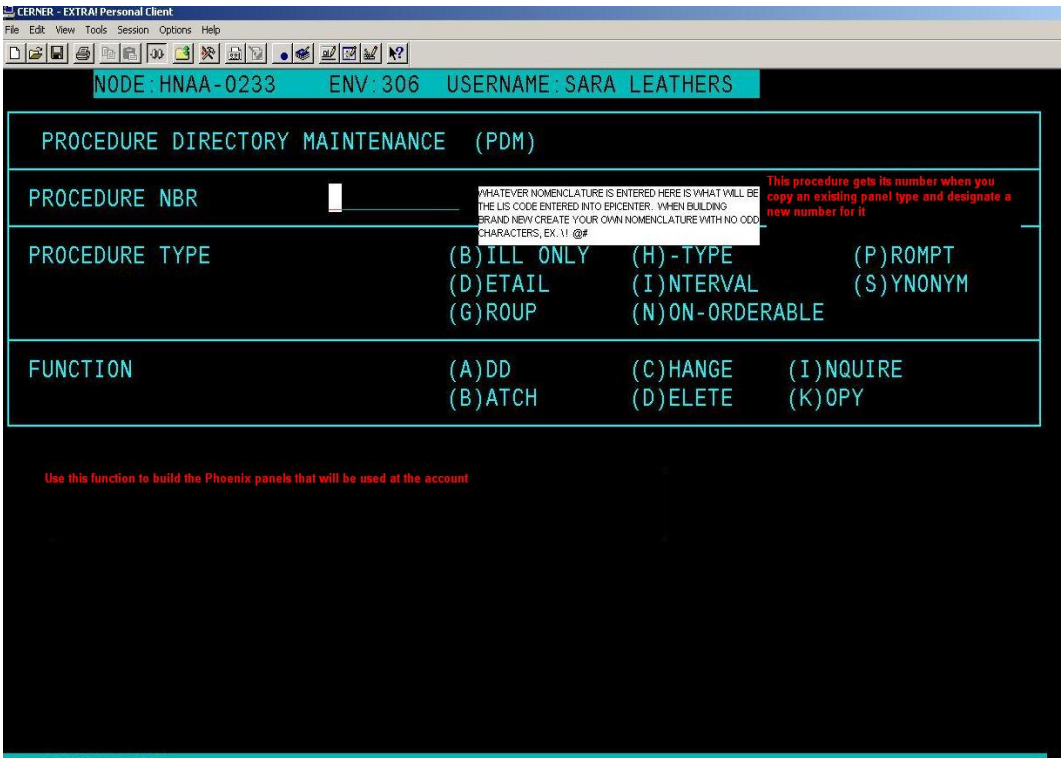

CERNER - EXTRA! Personal Client
File Edit View Tools Session Options Help
NODE:HNAA-0233 ENV:306 USERNAME:SARA LEATHERS
PROCEDURE DIRECTORY MAINTENANCE (PDM)
PROCEDURE NBR
PROCEDURE TYPE
FUNCTION
A - All
L - General Lab
M - Microbiology
B - Blood Bank
P - Anatomic Pathology
I - Infection Control
C - Internal Medicine
R - Radiology
S - Scheduling
G - Generic procedures
lab section procedures to display, enter: M
THE EASIEST WAY TO BUILD THE NEW TESTS IS TO TAKE AN EXISTING PROCEDURE, COPY IT, AND THEN MODIFY THE FIELDS AS NECESSARY. IN THE FUNCTION "PDM" BY HITTING THE F3 KEY FOR HELP YOU GET THIS SCREEN, SELECT "M" FOR MICRO AND YOU WILL GET A DISPLAY OF EXISITNG AST PANELS THAT COULD BE USEFUL FOR COPYING.
1(017,061)
Start
CERNER - EXTRA! Pers...
MIM_FUNCTION2 - Paint
CAP NUM
11:24 AM

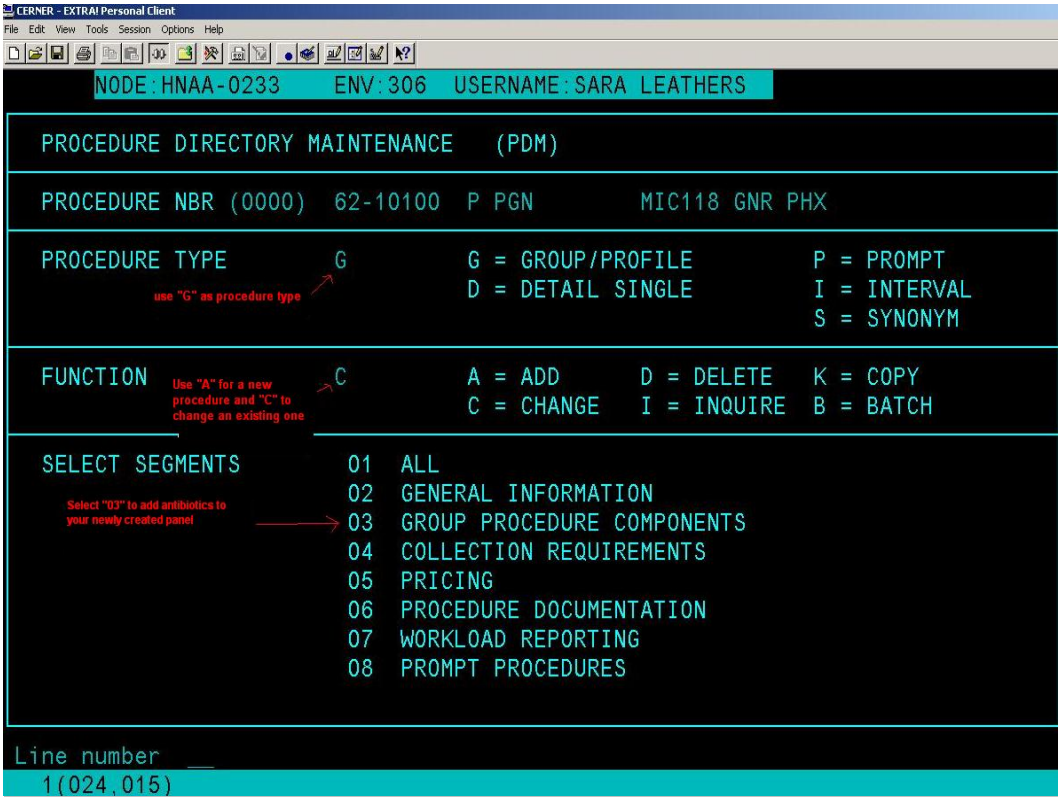

CERNER - EXTRA! Personal Client
File Edit View Tools Session Options Help
NODE:HNAA-0233 ENV:306 USERNAME:SARA LEATHERS
PROCEDURE DIRECTORY MAINTENANCE (PDM)
PROCEDURE NBR
PROCEDURE TYPE
FUNCTION
01 P EH 6201931 E-TEST - HAEMOPHILUS G
02 P EHC 6201193 E-TEST - HAEMOP, CSF/BRAIN G
03 P ERES 6210111 ETEST RESISTENT GNR G
04 P ESPNE 6201941 E-TEST - STREP PNEUMO G
05 P EST 6202060 E-TEST - STREP SPECIES G
06 P KBSB 6202000 KB - STREP B GENITAL G
07 P KH 6201925 KB - HAEMOPHILUS G
08 P KPSAM 6201926 KB PA-ALL MUC-OPTIONAL NONCRIT G
09 P KPSUR 6201928 KB PA-URINE G
10 P KSB 6210110 KB STENO/B.CEPACIA G
*** continued ***
Select 01
EXAMPLE OF WHAT PULLS UP IN HELP SCREEN WHEN TYPE IN THE LETTER "P"
1(017,025)

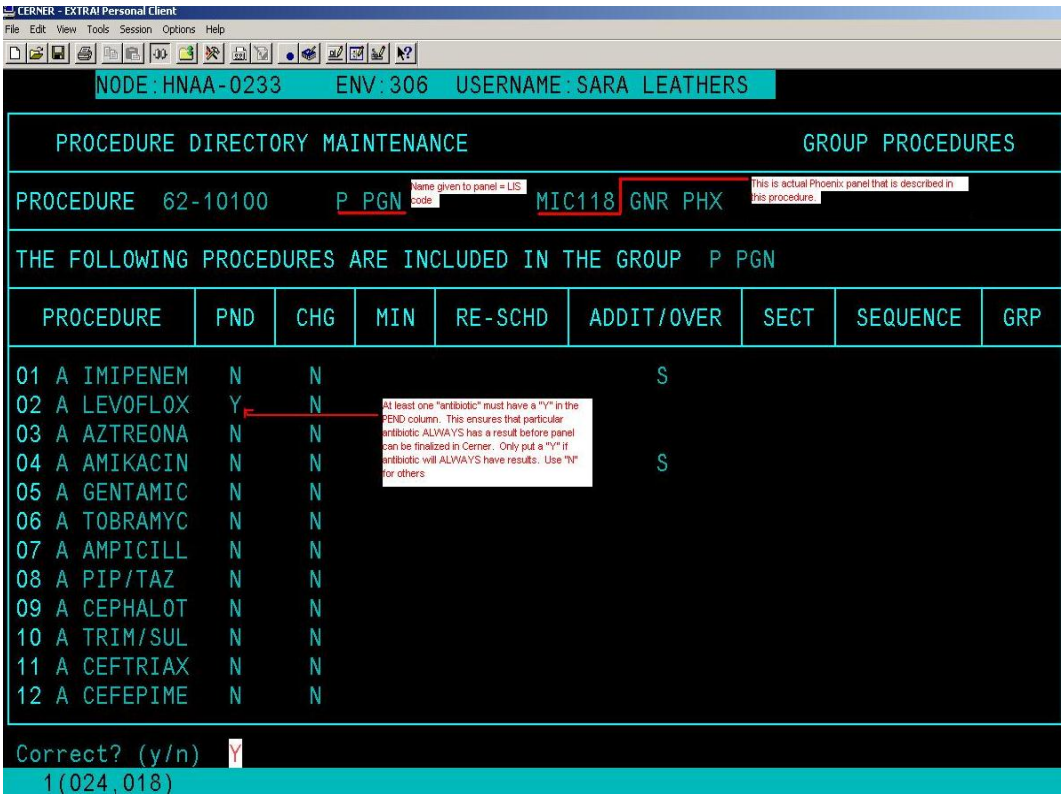




- The LIS code in EpiCenter for each panel should match the name given to it in the Cerner configuration


CERNER - EXTRA! Personal Client
File Edit View Tools Session Options Help
NODE:HNAA-0233 ENV:306 USERNAME:SARA LEATHERS
PROCEDURE DIRECTORY MAINTENANCE (PDM)
PROCEDURE NBR
WHATEVER NOMENCLATURE IS ENTERED HERE IS WHAT WILL BE THE LIS CODE ENTERED INTO EPICENTER. WHEN BUILDING BRAND NEW CREATE YOUR OWN NOMENCLATURE WITH NO ODD CHARACTERS, EX. \! @#
This procedure gets its number when you copy an existing panel type and designate a new number for it
PROCEDURE TYPE
(B)ILL ONLY
(D)ETAIL
(G)ROUP
(H)-TYPE
(I)NTERVAL
(N)ON-ORDERABLE
(P)ROMPT
(S)YNONYM
FUNCTION
(A)DD
(B)ATCH
(C)HANGE
(D)ELETE
(I)NQUIRE
(K)OPY
Use this function to build the Phoenix panels that will be used at the account


CERNER - EXTRA! Personal Client
File Edit View Tools Session Options Help
NODE:HNAA-0233 ENV:306 USERNAME:SARA LEATHERS
PROCEDURE DIRECTORY MAINTENANCE (PDM)
PROCEDURE NBR (0000) 62-10100 P PGN MIC118 GNR PHX
PROCEDURE TYPE G
use "G" as procedure type
G = GROUP/PROFILE
D = DETAIL SINGLE
P = PROMPT
I = INTERVAL
S = SYNONYM
FUNCTION
Use "A" for a new procedure and "C" to change an existing one
C
A = ADD
C = CHANGE
D = DELETE
I = INQUIRE
K = COPY
B = BATCH
SELECT SEGMENTS
Select "03" to add antibiotics to your newly created panel
01 ALL
02 GENERAL INFORMATION
03 GROUP PROCEDURE COMPONENTS
04 COLLECTION REQUIREMENTS
05 PRICING
06 PROCEDURE DOCUMENTATION
07 WORKLOAD REPORTING
08 PROMPT PROCEDURES
Line number
1(024,015)



- Enter PDM numbers into EpiCenter
  - Obtain a list of PDM numbers for every antibiotic on the Phoenix panels that will be in use at the account.
  - Those PDM numbers must be put into EpiCenter as the LIS code for the antibiotic it pertains to.
    - Use caution as many antibiotics have several PDM numbers, you must get the correct ones from the interface specialist you are working with at the account.

Classic Driver Capabilities

Driver able to multiplex multiple instrument type orders? **Currently must request latest version of Classic Multiplexor Driver by Bill Bryant**	✓
Host Query supported?	✗
Unsolicited demographic only download supported? **For Classic test codes are not sent, so once Phoenix panel is ordered in Cerner the demographics are automatically downloaded**	✓
Unsolicited Test ordering supported? **Same as above.**	✓
LIS result query?	✗
Able to order offline test? » Kirby Bauer » E-test » Manual susceptibilities should be possible if created as an MIC test in Cerner	✓
Able to download offline ID results to EpiCenter	✗
Able to download offline AST results to EpiCenter	✗
Able to write logic rules to change results **Need clarification from Roger here.**	✓

Patient ASTM Field Mapping

EpiCenter Field Name	Sent By Cerner	F	C	R	Cerner Field Name
Patient ID	✓	4	1	1	Medical Record Number
Patient Last Name	✓	6	1	1	Person Last Name
Patient First Name	✓	6	2	1	Person First Name
Patient Middle Name	✗	6	3	1	
Patient Name Suffix	✗	6	4	1	
Patient Name Title	✗	6	5	1	
Date of Birth	✓	8	1	1	Date of Birth
Patient Sex Code	✓	9	1	1	Sex
Street Address	✗	11	1	1	
City Address	✗	11	2	1	
State Address	✗	11	3	1	
Zip Code Address	✗	11	4	1	
Country Address	✗	11	5	1	
Patient Phone Number	✗	13	1	1	
Admitting Physician Code	✓	14	1	1	Attending Physician
Patient User Field 1 Code	✗	15	1	1	
Patient User Field 2 Code	✗	15	1	2	
Patient User Field 3 Code	✗	15	1	3	
Patient User Field 4	✗	15	1	4	
Patient User Field 5	✗	15	1	5	
Patient Diagnosis	✗	19	1	1	
Patient Therapy 1	✗	20	1	1	
Patient Therapy 2	✗	20	1	2	
Patient Therapy 3	✗	20	1	3	
Patient Therapy 4	✗	20	1	4	
Patient Therapy 5	✗	20	1	5	
Admission Date/Time	✓	24	1	1	Admission Date/Time
Room Number	✓✗?	26	1	1	Room Number
Hospital Service LIS Code	✓	33	1	1	Location Code/Nursing Unit
Client Code	✓	34	1	1	Client (SCR - currently Institution Name)

Order ASTM Field Mapping

Field Name	Sent By Cerner	F	C	R	Cerner Field Name
Accession Number	✓	3	1	1	Accession Number
Isolate Number-	✓	3	2	1	Isolate Number (#)
Organism LIS Code	✓	3	3	1	Organism
Test Code	✗	5	4	1	
Test Sequence Number	✗	5	5	1	
Collect Date/Time	✓	8	1	1	Collection Date/Time
Collected By Code	✗	11	1	1	
Received By Code	✗	11	2	1	
Specimen Action Code	✗	12	1	1	
Isolate Source Test 1	✗	14	1	1	
Isolate Source Test 2	✗	14	1	2	
Isolate Source Test 3	✗	14	1	3	
Isol Source Test Start Time 1	✗	14	2	1	
Isol Source Test Start Time 2	✗	14	2	2	
Isol Source Test Start Time 3	✗	14	2	3	
Receipt Date/Time	✓	15	1	1	Specimen Receive Date/Time
Specimen Type Code	✓	16	1	1	Specimen Type
Body Site Code	✓	16	2	1	Body Site
Ordering Physician Code	✗	17	1	1	
Ordering Physician Phone	✗	18	1	1	
Ordering Physician Fax	✗	18	2	1	
Ordering Physician Pager	✗	18	3	1	
Specimen User Field 1 Code	✗	19	1	1	
Specimen User Field 2 Code	✗	19	1	2	
Specimen User Field 3 Code	✗	19	1	3	
Specimen User Field 4	✗	19	1	4	
Specimen User Field 5	✗	19	1	5	
Finalized Date/Time	✗	23	1	1	
Specimen Reimbursement	✗	24	1	1	
Test Reimbursement Value	✗	24	1	2	
Isolate Classification	✗	29	1	1	

Result Upload Capabilities

Capability	Supported	ASTM Reference
Driver able to multiplex multiple instrument type results? Yes but having some problems with workflow and the configuration, as it is a new function of Classic.	✓	8
Able to receive Isolate level ID/AST results?	✓	1
Able to handle multiple Isolates? Currently an issue where Cerner needs to select 1 or 2 digit isolates number. If 1 digit then only 9 isolates supported. Classic is 1 digit so only 9 isolates supported	✓	2
Isolate Results use Test Source field? Need Roger's clarification The test source is required for posting purposes. The test source code must be configured in the Cerner external files as well as translation tables in order to post.	✓	1
Able to receive Test level ID/AST results?	✗	
Able to receive Preliminary results? Yes but does not work well when some results are already present. Works best to wait until complete to transmit.	✓	
Able to receive Final results?	✓	1
Does retransmission of results update the LIS? **See statement above. Retransmit often causes issues. Not a good workflow to suggest ability to transmit early results.** As long as the entire isolate is not verified in Cerner, causing the isolate to be completed for susceptibilities, then any value (organism and drug result) can be updated. The update will OVERWRITE the existing value. Drug results in "Pending" or "Performed" status can be updated. A "Verified" drug result can NOT be updated.	✓	1
Rapid Complete "C" results supported? Due to issues with retransmit (as stated above) this is not a feature that would be very useful. Provided the value of "C" is added as a valid MIC result for that drug.	✓	
Non-numeric MIC values supported? Provided the value is added as a valid MIC result for that drug.	✓	1
Blank MIC values supported? A blank value will simply not post in Cerner. In order to be able to verify the result (with an SIR value), the drug should be configured as not required on that panel. The isolate can not be verified and completed if a required drug is missing an MIC. It is recommended that all but one drug on a panel be defined as not required to lessen the impact of this	✓	4

MIC and SIR "X" supported? Provided the value of "X" is added as a valid MIC and valid SIR result for that drug.	✓	
MIC and SIR "N" supported? Provided the value of "N" is added as a valid MIC and valid SIR result for that drug.	✓	
Variable number of result records supported?	✓	
Inferred results supported? The list of predefined drugs for a panel are displayed in the results entry screen, but they should be set to not required. In this case all drugs in the formulary will be listed on the panel but would remain blank and in a pending status unless inferred. As long as the inferable drug is defined as not required, the panel can be verified.	✓	4
MGIT AST supported?	✗	
Able to receive offline test-level results?	✗	
Able to receive offline Isolate results (Kirby Bauer, E-Test)? » E-tests are handled. » Any other manual susceptibilities can be defined as MIC type tests. » Kirby Bauer's can be ordered separately and reported in Isolate message. Result posted to KB test with the SIR interpretation posted in the "Interpretations" column and "00" posted in the "KB Zones" field. Note: For Cerner Classic you must first build the manual panel on the Cerner side (as you must do with a Phoenix panel) before it will post manual results uploaded by EpiCenter	✓	
Resistance markers treated as drug results? » For Classic you must create a fake drug in Epi and build the same drug in Cerner then create EpiCare rules to infer the fake drug when the Resistance Marker is present. Being sure not to make the fake drug one of the ones on the panel that is required to be resulted before the results can be finalized.	✓	
Resistance markers treated as separate results?	✗	
Patient Comments supported?	✗	
Specimen Comments Supported?	✗	
Isolate comments supported?	✗	
Unrecognized LIS Code Behavior? Any unrecognized code will simply cause the result not to be posted. No error messages will be generated on the front end. Backend log files accessible to the Cerner MDI may indicate the reason a value was not posted.		

Isolate Result ASTM Field Mapping

Field Name	Accepted By Cerner	Coded Field	F	C	R	Comments
Result Type	✓		3	4		
Antimicrobial Code	✓	✓	3	6		Use PDM numbers from Cerner
Antimicrobial Conc.	✗		3	7		
Antimicrobial Conc. Units	✗		3	8		
MIC (AST)	✓		4	2		
Organism (ID)	✓	✓	4	2		
Final SIR (AST)	✓		4	3		
Organism Profile (ID)	✗		4	3		
Interpreted SIR (AST)	✗		4	4		
Resistance Marker 1 (ID)	✓		4	4		If created as fake antibiotic and posted as drug results
Expert SIR (AST)	✗		4	5		
Resistance Marker 2 (ID)	✓		4	5		If created as fake antibiotic and posted as drug results
AST Test Source	✓		4	6		
Resistance Marker 3 (ID)	✓		4	6		If created as fake antibiotic and posted as drug results
Resistance Marker 4 (ID)	✓		4	7		If created as fake antibiotic and posted as drug results
Resistance Marker 5-10 (ID)	✓		4	8 -		If created as fake antibiotic and posted as drug results

Comment Text	✗		4	1	1	
Comment Type	✗		5	1	1	

Test Result ASTM Field Mapping

Field Name	Coded Field	F	C	R	Phoenix	MGIT	BT9000	Comments
Result Type		3	4		✗	✓	✓	
Sequence Number		3	5		✗	✗	✗	
Antimicrobial Code	✓	3	6		✗	✗	✗	
Antimicrobial Conc.		3	7		✗	✗	✗	
Antimicrobial Conc. Units		3	8		✗	✗	✗	
Test Status Code	✓	4	1		✗	✓	✓	
Result Data Field 1	✓*	4	2		✗	✓	✗	
Result Data Field 2		4	3		✗	✗	✗	
Result Data Field 3		4	4		✗	✗	✗	
Result Data Field 4		4	5		✗	✗	✗	
Result Data Field 5		4	6		✗	✗	✗	
Preliminary/Final Status		9	1	1	✗	✓	✓	
Entry Date/Time		12	1	1	✗	✗	✗	
Test Result Date/Time		13	1	1	✗	✗	✗	
Test Complete Date/Time		13	2	1	✗	✓	✓	
Instrument Type		14	1	1	✗	✗	✗	
Media Type		14	2	1	✗	✗	✗	
Protocol Length		14	3	1	✗	✗	✗	
Instrument Number		14	4	1	✗	✗	✗	
Instrument Location		14	5	1	✗	✗	✗	
Additional Result Quantity 1		15	1	1	✗	✗	✗	
Additional Result 1		15	2	1	✗	✗	✗	
Additional Result Quantity 2		15	1	2	✗	✗	✗	
Additional Result 2		15	2	2	✗	✗	✗	
Additional Result Quantity 3		15	1	3	✗	✗	✗	
Additional Result 3		15	2	3	✗	✗	✗	
Additional Result Quantity 4		15	1	4	✗	✗	✗	
Additional Result 4		15	2	4	✗	✗	✗	
Additional Result Quantity 5		15	1	5	✗	✗	✗	
Additional Result 5		15	2	5	✗	✗	✗	

*Coded Organism field for ID tests only

Query ASTM Field Mapping

Field Name	Sent By Cerner	Supported by Cerner	Coded Field	F	C	R	Comments
Request Start Patient ID	X	X		3	1	1	
Request Start Accession No	X	X		3	2	1	
Request Start Sequence No	X	X		3	3	1	
Request End Patient ID	X	X		4	1	1	
Request End Accession No	X	X		4	2	1	
Request End Sequence No	X	X		4	3	1	
Request Test ID	X	X		5	1	1	
Request Test Status Code	X	X		5	2	1	
Request Instrument Type	X	X		5	3	1	
Request Instrument Number	X	X		5	4	1	
Request Result Qualifier	X	X		5	5	1	
Request Time Qualifier	X	X		6	1	1	
Request Starting Date/Time	X	X		7	1	1	
Request Ending Date/Time	X	X		8	1	1	
Request Information Status	X	X		1	1	1	

Comment ASTM Field Mapping

Field Name	Accepted By Cerner	Coded Field	F	C	R	Comments
Comment Text	X		4	1	1	
Comment Type	X		5	1	1	

1. Blood Culture Setup THIS IS FOR MILLENIUM

Blood cultures must be routed to this instrument in Department Order Catalogue Wizard (deptorcwizard.exe). This program is where all orderable tests are created and routed to the different instruments.

This is normally configured by the Cerner Micro specialists using the MIC DB front end setup tool.

Media Tool

It is necessary to add a translation for the bottle that is built on Cerner to the EpiCenter test code for the bottle or tube loaded to the instrument. The translation code entered here must match the LIS test code defined in the EpiCenter.

TEST MNEMONIC	TRANSLATION
MGIT 960	4301
Bactec Aerobic	PLUSAEF
Bactec Anaerobic	PLUSANF

NOTE: In the table above, the default EpiCenter codes for MGIT 7ml tube and Bactec aerobic and anaerobic bottles are illustrated. This may be different if different media type is used by the customer.

ANG Tool

ANG is where the automatic no growth status is defined in Cerner. The Reports and disqualifying responses tab must be built before Cerner will transmit any blood cultures down to the instrument.

- “Active within the ANG Process” box should be checked.

Ordering Process in the LIS

The following section will give a brief overview of the process and screens used in Cerner to Order a test and download it to EpiCenter

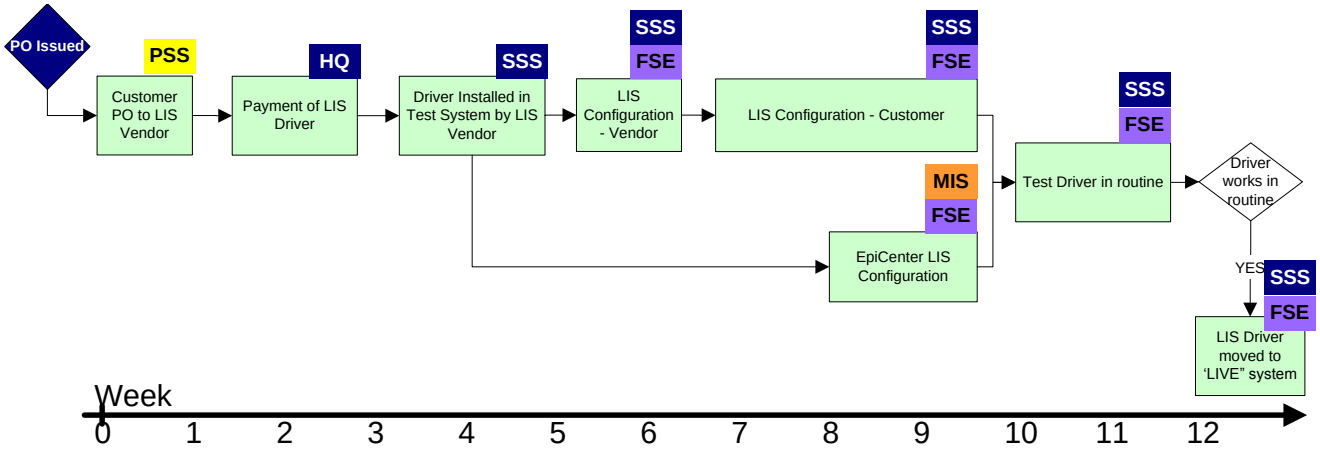
Expected Timelines

A Cerner Millennium interface project can be expected to complete within 3 months. The following points highlight activities in the process, how long each activity should take and the potential risks for delay. This timeline should be used as a guide only and assumes:

- A completed driver with no additional requirements needed for development.
- A Cerner MDI is assigned to the account
- A dedicated resource from the customer is available to configure the Cerner system, and they have some experience in preparing instrument interfaces.

Interface Ordering

1. **Interface quotation:** The interface quotation should normally be requested by BD. The response to an interface quotation request is normally prompt. This is done during the sales process so does not impact the timeline. Allow 1 week.
2. **Customer PO to Cerner:** Once the PO has been placed with BD for the instrument, the PO should be placed with Cerner for the interface. See the driver ordering process description in the following section. Allow 1 week for receipt and processing.
3. **Driver Payment:** Once the PO has been received, payment should be made. Depending on the sales agreement, the PO Invoice should normally be settled by BD. Typically the driver is not installed until payment is received. Allow 2 weeks for processing and confirmation of receipt.
4. **Driver installed in Customer Test System:** After payment of the driver, driver installation is based on (MDI schedule?). Allow 2 weeks.
5. **Cerner Configuration – MDI**: The basic configuration of the driver done by the MDI. While the MDI may continue to do configuration with the customer, typically they have to do theirs first before the customer can begin. Note that while the activity is performed by the LIS vendor, someone from BD is accountable for ensuring the activity takes place. Allow 1 week
6. **Cerner Configuration – Customer**: Configuration by the customer using the User interface tools. Resource availability and skills impact the duration of the activity, but it should be possible to complete in 4 weeks. Note that the activity is performed by the customer, but a BD associate is accountable for monitoring progress.
7. **EpiCenter Configuration:** Configuration of LIS based on Audit, loading of coded lists. The customer providing the coded lists and reformatting is often related to their configuration effort in the LIS, so while it can be done quickly in EpiCenter, can only be completed over an extended period of time. Allow 2 weeks.
8. **Driver Testing**: There will normally be an element of testing during the configuration process, but once all configuration is completed, final testing of all aspects should be done using a normal routine workflow, covering as many variations as possible. Note that some customers may elect to do their configuration and testing directly in to the “Live” environment. This is often done as a result of time pressures, or where the test environment differs so much from the live environment that testing there would not provide significant benefit. In such cases the last step is not required. Duration is variable based on customer protocols, but allow 2 weeks.
9. **Configuration Transport to Live Cerner**: This final step copies the setup in the test environment to the live environment and may involve some limited testing again. This could take between 1-2 weeks.



Driver Ordering Process

The process for ordering a Cerner Interface driver is described below. This process is the same for Cerner Classic and Cerner Millennium systems, and remains consistent regardless of instruments being connected.

1. Send request for interface ordering to Roger Nicolson. This should only be done once the PO has been received by BD with all signatures. Detailed information about the interface needs to be included in the request:
    a. Listing all the instruments that will be connected.
    b. Indicate whether the connection is via EpiCenter or a direct instrument-LIS connection.

2. Cerner Regional sales associate or regional team leader is contacted, requesting Interface quotation and Interface invoice. The request for quotation should indicate the detailed connection requirements, and include the Cerner specific interface codes.

3. Cerner will respond with a quotation and invoice that should be reviewed for correctness of the driver and charges.

4. If correct and no invoice correction is needed, the invoice will be paid by BD.

Appendix A: Driver flags

Flag	Description
+PRO[XX]	In order for the system to change an organism's name from GNR to the specific one identified by the device, a percent probability has to be provided. This device does not send a percent across the interface, however, it will not send an organism unless it is 90% certain the organism it identified is correct. The probability that is entered in this software flag will be what appears in MICResultEntry
+RM	This enables the interface to process resistance markers. The maximum number of markers the interface and epicenter can handle is 5. In order for these markers to be viewable in MICResultEntry, they will need to be built as if they were antibiotics. When the interface processes this data, the presence of the marker indicates that it is true. Both the result and the marker name will be the LIS code defined on the instrument for that particular marker.
+INTRP[4]	The Epicenter can send two different types of interpretations, a generic interpretation and an expertised interpretation. With this flag enabled, the expert interpretation will be used for our MINT (interpretation) **Adding this causes KB to post at isolate level.**
+PHNX	Use this flag if the Epicenter has a Phoenix attached to it.
AR:X	Numeric results will be prefixed with a character.
AL_ID	Alpha identifier is enabled
CAN	Canadian date logic is in use.
+MGIT	This flag will media type from 3,5, default is 14,2
+MRN	The MRN will be downloaded in the patient record, default is accession number
L[x,y]	This tells the interface how many digits of the accession are downloaded. Starting at position 'x', the interface will send 'n' digits to the instrument. The default is L[0,9].
+ML	Enables Multiplexor logic.

Flag	Description
-ISO	Suppresses the downloading of the organism from Cerner to the device. This particular device will not perform an ID if we download an organism, even if it is aliased as GNR.
+DN	This software flag enables the doctor number (person_id) to download instead of the doctor name.
+MIC[X,X]	This flag must correlate to what is built in the susceptibilities translation, under susceptibility procedures. The default translation for MIC dilution is a3 and MIC interpretation is a4. If this flag is enabled, enter either ZONE or MIC in the first position and INTERP or NCB in the second position. Note what you have defined here must not conflict with the +KB[X,X] or +ETST[X,X] flags.
+KB[X,X]	This flag must correlate to what is built in the susceptibilities translation, under susceptibility procedures. The default translation for KB dilution is ZONE and KB interpretation is INTERP. If this flag is enabled, enter either a3 or MIC in the first position and a4 or NCB in the second position. Note what you have defined here must not conflict with the +MIC[X,X] or

+ETST[X,X] flags.

+ETST[X,X] This flag must correlate to what is built in the susceptibilities translation, under susceptibility procedures. The default translation for E-test dilution is MIC and E-test interpretation is NCB. If this flag is enabled, enter either a3 or ZONE in the first position and a4 or INTERP in the second position. Note what you have defined here must not conflict with the +MIC[X,X] or +KB[X,X] flags.