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THE CDF TRIGGER TABLE

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1 INTRODUCTION

Because of the complexity of hadron-hadron collisions, the trigger for CDF is capable of making fairly sophisticated decisions. It is a five level system; levels 0-2 are in trigger hardware, level 3 is in a microprocessor farm, and level 4 is the collection of selection criteria applied during the logging of events to tape.

Programming the trigger to make reasonable decisions based on physics interest is a rather difficult task. The trigger or physics table provides a simplifying mechanism for describing the selection criteria at a physics level. The physics table is compiled automatically into the programs loaded into the trigger hardware, it is parsed in level 3 in order to set up trigger processing in the microprocessor farm, and it is parsed in the tape logger process in order to control what events are written to tape. Automatic calibration processes working from the data stream in the B0 Vax Cluster can also be controlled from the physics table. The physics table has 5 sections, LEVELs 0,1,2,3,4, corresponding to the divisions discussed above.

Naming conventions were established for physics tables so that during physics analysis the table name indicates whether the mix of triggers differed by other than pre-scale values. Thus, a standard name adopted was PHYSICS_V28$3 where the major version number "28" changed if the list of triggers changed or the level 3 executable image changed. The minor version number "3" changed if prescale parameters changed.

The physics table is a text file which can be created or changed with any text editor. One of the goals in designing the physics table was to make it easily readable and understandable by physicists. Verbosity was preferred to brevity for the sake of clarity. Thus, although the syntax below is reasonably concise, the hardware options and level 3 parameters have been given verbose names to help (hopefully) with understanding the triggers. An example table is given in Appendix I.

2 SECTIONS CONTROLLING TRIGGERS, LEVEL 0,1,2,3

The level 0,1,2,3 sections of the physics table have syntax and other features in common. Each LEVEL consists of descriptions of one or several independent triggers. Each TRIGGER is identified by a name and level and includes all information about cuts and selection criteria. The name uniquely identifies the trigger in that the correspondence between the name and selection criteria and the values of the cuts are checked when the physics table is compiled. The physics table determines the programs and thresholds downloaded to the hardware trigger and determines which modules of software are activated with what thresholds and parameters in the level 3 nodes. In order to provide a record of what triggered an event the name of each trigger in the physics table and its pass/fail status is stored in the TAGC bank in the event. The physics table itself is written to the run conditions data base, and kept in the Begin Run Record on tape.

A physics table compiler exists whose function is to:

1. Verify the uniqueness of each trigger in all trigger levels.
2. Create the binary code to be downloaded to the hardware for levels 0,1,2.
3. Create the TAGC bank (see below) which is included in the event. Note that this is a "nascent" TAGC bank which contains no trigger result information.

Note that the nascent TAGC bank is written to the run conditions data base also.

3 SYNTAX OF TRIGGER SECTIONS OF TABLE

The formal structure of the trigger sections, LEVEL 0,1,2,3, is:

```
LEVEL Level_Number
  TRIGGER Trigger_Name
    PREREQUISITE(/VETO)     Trigger_Name(/LEVEL=Level_Number)
      PARAMETER             expression                  [for levels 0,1,2]
    EXECUTE                 Execute_Name
      PARAMETER             expression                  [for levels 0,1,2]
      PARAMETER TALK_TO                                 [for level 3]
         expressions                                    [for level 3]
      END_TALK                                          [for level 3]
    SELECT(/VETO)           Select_Name
      PARAMETER             expression                  [for levels 0,1,2]
      CUT                   expression                  [for levels 0,1,2]
      PARAMETER TALK_TO                                 [for level 3]
         expressions                                    [for level 3]
      END_TALK                                          [for level 3]
    FRACTION                Fraction_value              [for level 3]
END_TABLE
```

LEVEL specifies the trigger level. This can be 0, 1, 2, or 3 for triggers. Within each LEVEL there can be one or more TRIGGERs, any of which cause the event to be accepted at that level. At least one trigger in each of levels 0,1,2 must be accepted for the event to be sent to level 3.

The TRIGGER name must be unique within that level. In addition, when the physics table is compiled, the name is checked against the list of previously used triggers, and if the name was used before, all items in the trigger must match (except pre-scale and rate limitation settings). If the name is new, it can be added to the list. See Appendix II for a partial list of trigger names.

The PREREQUISITE statement allows the requirement that a specific trigger in a previous level has been passed. The default level is the preceding level, i.e. if the current level is 3 the PREREQUISITE applies to level 2 triggers. This can be overridden with the /LEVEL qualifier. The /VETO qualifier requires that the specified trigger has failed. Level 3 can test on earlier level 3 triggers.

The EXECUTE statement is used to activate analysis modules in level 3, and, with the PARAMETER statement, to specify parameters both for level 3 modules and for hardware processors which in some way analyze the data but do not actually make yes/no decisions for the trigger. The seed and shoulder threshold for a level 2 cluster finding algorithm, for example, would be specified in an EXECUTE and PARAMETER group.

SELECT replaces EXECUTE when a yes or no decision on the event is required. All SELECT statements within a trigger must be passed before the trigger is accepted. The /VETO qualifier reverses the yes/no decision for the module.

The PARAMETER statement is used to pass values to the module which are used in determining how the module is run. The CUT statement is used to specify values which are used in comparisons to check whether or not an event passes. The distinction between PARAMETERS and CUTS is somewhat vague and the use of them depends on the specific module. The trigger table compiler treats PARAMETERS and CUTS in the same way. Level 3 does not use CUT.

The parameters values and cuts in the hardware sections, LEVEL 0,1,2, are subject to a constrained syntax, as explained below. The parameter labels and function (upper limit, lower limit, etc) for analysis modules in level 3 have not been constrained in syntax. Hence the physics table compiler cannot verify level 3 parameters, and so extra syntax keywords TALK_TO and END_TALK differentiate level 3 parameter groups from level 0,1,2. This may change in the future.

PARAMETERS and CUTS in levels 0,1,2 both specify expressions in the form NAME $\{<, <=, =, >=, >\}$ VALUE UNITS, e.g. ENERGY > 10.0 GeV. The NAME is defined by the module and is used to specify the parameter or cut. The relational is $<, <=, =, >=$, or $>$. The value is a real number and the UNITS are any text string used to make the statement more readable. Note that 1 GeV is not the same as 1000 MeV; The units are only a label to make the table more readable and the parser does not understand units. Appendix III shows the options table which defines the PARAMETER and CUT possibilities.

FRACTION is a level 3 statement that activates an analysis module that returns yes a fraction_value of trials. It is thus similar in action to a pre-scaler. Fraction_value is a real number, e.g. 0.1, 1.0E-3, etc.

4 THE PHYSICS TABLE COMPILER and TAGC BANK

TRIGGER specifies a name used for a unique set of conditions. When the physics table is compiled, the name is checked against the list of existing names. If the trigger was previously used, the current and previous definitions must agree, with the exception of pre-scale values and rate limitations. If a disagreement is found, the parser will stop with a fatal error and the code needed to download to the hardware trigger will not be generated. If the current trigger is not found it will be entered into the data base (data base TRIGTABL, attribute L12, components TRG and TGB).

The trigger compiler generates the code which will be downloaded to the trigger hardware. The code is stored in a YBOS array in a disk file and is read when devices are initialized at the beginning of a run. The physics table must be compiled before the downloading can start.

The physics table is stored in the run conditions data base with attribute L12 and component FIL. If the details of what triggers were active and what thresholds were used during the run are needed in the offline analysis then the physics table will have to be read and parsed. When event selection based on the hardware trigger is required during offline analysis the information in the TAGC banks is more useful. The nascent TAGC bank (without trigger result information), which is created by the compiler, is stored in the run conditions data base with attribute L12 and component TAG. It is also stored in a memory module in the trigger hardware where it is read out for every event.

The TAGC bank contains an entry for each trigger. This entry has the trigger's level, trigger name in A32, the trigger's bit pattern used in the trigger mask (four I*4 words, see below) and a trigger result word or pass/fail flag. The complete format is described in note CDF-152.

The triggering for an event is described by both the trigger mask and the TAGC bank. The trigger mask is four I*4 words used by the data acquisition system to characterise the event separately from the event record, with one bit on for each trigger satisfied in the physics table. A copy of the trigger mask is kept in bank EVCL in the event record.

The correspondence between triggers in TAGC and bits in the trigger mask is stored in a trigger's bit pattern in TAGC, which contains one bit assigned to the trigger and also the bits corresponding to its PREREQUISITE triggers. Thus online, a particular event will have passed a trigger if the bit pattern from TAGC for that trigger when ANDED with the trigger mask in EVCL results in the specific trigger mask, i.e.

[PASS = (BIT_PATTERN .AND. EVCL) .EQ. BIT_PATTERN].

5 LEVEL 3 OPERATION

The host and node executable images used in the level 3 microprocessor farm are compiled and linked by normal ACP methods, and not constructed from the physics table as is true for the trigger hardware. However, a parsing routine in the farm steward (host process) is given the physics table by run_control at run start time, and the CDF Analysis_Control package is used to make the flow chart for the analysis modules in the nodes. In this flow chart, triggers become A_C paths, "SELECT select_name" executes an A_C filter module "select_name", and "EXECUTE

execute_name" executes module "execute_name". All paths (triggers) are executed, but a path is aborted once a SELECT (/VETO) module returns false (true); this is the usual A_C convention.

Special level 3 A_C modules are inserted in paths to perform functions PREREQUISITE and FRACTION, and to transfer the result of a trigger into the TAGC bank. Note that all nodes contain the same collection of analysis modules and process the complete mix of triggers. The parsing of the physics table is done using the CDF package Uipack with a level 3 verb definition file. There are also special level 3 modules explicitly actiated in the physics table to control the list of dta banks generated by level 3 analysis, and to control print output with every event.

Level 3 executable images are given a single version number which is written to the TL3D bank in every event along with trigger statistics. There is obviously a close connection between physics tables and the particular image used, although no mechanism verifies or forces the connection currently.

A_C analysis modules have a standard set of entry points, of which only Job Initialisation, Run Start, Event Process, Run End, Job End, and Talk To, are used in level 3. Calibration constants, geometry information, etc, read from external sources (data bases, files) by any module are placed in YBOS bank(s) to be transmitted to the nodes. Similarly, sets of control parameters can be constructed in ybos bank(s) in the host, and transmitted to the nodes (or they can be constructed in the nodes directly).

A subset of a module's control parameters can be listed in the physics table in a group bracketed by the PARAMETER TALK_TO, END_TALK statements which follow the EXECUTE or SELECT statements for that module. The subset is generally the set needed to study trigger rates, make physics tests online, make the same module test for 2 jets rather than 1, etc. The ability to vary parameters from the physics tables avoids re-compiling executable images for such changes.

The Talk To entry for A_C analysis modules, and the A_C concept of parameter sets, are used to pass the parameters from the physics table to the module. The Talk To entry is activated by the level 3 parsing routine when the PARAMETER TALK_TO statement is encountered in the physics table, with a parameter set number assigned by the parsing routine. The module uses this number in the Talk To entry in constructing its ybos bank, and when reading the parameters during the Event Process entry. A_C keeps track of the correct parameter sets to use in the flow chart laid out by the physics table.

There are, currently, no rules on the syntax used in the parsing of the parameters from the physics table in the analysis module Talk To entries, except that Uipack must be used. Thus, level 3 PARAMETER groups are excluded from the checking for unique triggers in the physics table compiler.

Level 3 nodes also process the TAGC bank read from trigger hardware memory in each event. As read from the memory, no result words are set for the level 0,1,2 triggers. However, the trigger mask (used for online selection of triggers) in bank EVCL, carries the results, and the nodes set the level 0,1,2 results in TAGC before analysis modules are executed. After each trigger is completed in level 3, that result is entered into TAGC. After all level 3 analysis is completed, the level 3 TAGC results are set into the trigger mask.

6 LEVEL 4 - DATA LOGGER and OTHER AUTOMATIC PROCESSES

The physics table used to specify the online triggers can also be used to specify the event selection for online consumer processes, in particular for the data logger, thus controlling what events are written to tape. After events are processed by level 3, they are only passed further along the DAQ pipeline if one of the consumer processes such as tape logger asks for them.

Each consumer process reads the trigger table, parses the relevant level 4 section, and defines one or more "DAQ Requirements" which describe the type of data the DAQ system should send it. Keyword CONSUMER is used to mark the section of the table for each consumer process, e.g. CONSUMER DATA_LOGGER. The PARAMETER TALK_TO statement is used to indicate which Analysis_Control module in the consumer is used to define the DAQ requirements, e.g. PARAMETER TALK_TO DLOG_INPUT, and the pair of statements PARAMETER TALK_TO and END_TALK statements bracket this list of selection criteria.

Before describing the syntax of the level 4 part of the table, it will be useful to briefly describe a DAQ Requirement. There are two classes of requirements, the VIP requirement and an ordinary requirement. An ordinary requirement gives the Consumer no control over the actual fraction of events it receives. This means that the rate at which events are queued for a particular consumer process is dependent on the rate at which the Consumer is making requests rather than the basic event rate. VIP requirements privilege a Consumer so that it may look at all (or some user-determined fraction of all) events of certain categories. Note that these privileged requirements CAN CAUSE ADDITIONAL DEADTIME because of the synchronous nature of their requests.

A Consumer requirement is defined by a set of parameters. They are RECORD/EVENT TYPE, TRIGGER MASK, VETO MASK, REQUIREMENT TYPE, and for VIP requirements SAMPLING FREQUENCY and FREQUENCY TYPE. In the following description of the table syntax, these parameters are defined. For more information about the DAQ system see CDF$DOC:CDF156.MEM.

7 SYNTAX OF THE CONSUMER SECTION OF THE TABLE

This is an example of the LEVEL 4 section from a recent trigger table. DATA_LOGGER defines two VIP requirements since it needs to see all events and records. YMON defines a VIP requirement for non-event records and an ordinary requirement for event records.

```
LEVEL 4
    CONSUMER DATA_LOGGER
       PARAMETER  TALK_TO   DLOG_INPUT
          DAQ_REQUIREMENT
             ADD 'NON_EVENT_RECORDS'
                 'This requirement gets all nonevent records.'
                 LOWER_EVENT_BOUND BEGR
```

```
            UPPER_EVENT_BOUND FEND
            SAMPLING_FREQUENCY/PERCENT= '100.0'
            FREQUENCY_TYPE EQ
         ACCEPT/VIP
         ADD 'EVENT_RECORDS'
            'This requirement gets all event records.'
            EVENT_TYPE EVNT
            TRIGGER_MASK/LEVEL=2
                     <list of valid level 2 triggers>
            OK
            TRIGGER_MASK/LEVEL=3
                     <list of valid level 3 triggers>
            OK
            VETO_MASK/DEFA=ALLOFF
            REQUIREMENT_TYPE ANY
            SAMPLING_FREQUENCY/PERCENT= '100.0'
            FREQUENCY_TYPE EQ
         ACCEPT/VIP
      EXIT
   END_TALK
CONSUMER  YMON
   PARAMETER  TALK_TO   DAQ_INPUT
      DAQ_REQUIREMENT
         ADD 'NON_EVENT_RECORDS'
            'Non-Event Record Types'
            LOWER_EVENT_BOUND BEGR
            UPPER_EVENT_BOUND FEND
            SAMPLING_FREQUENCY/PERCENT= '100.0'
            FREQUENCY_TYPE EQ
          ACCEPT/VIP
          ADD 'EVENT_RECORDS'
            'This requirement gets some event records.'
            EVENT_TYPE EVNT
            TRIGGER_MASK/LEVEL=2
                     <list of valid level 2 triggers>
            OK
            TRIGGER_MASK/LEVEL=3
                     <list of valid level 3 triggers>
            OK
            VETO/DEFA=ALLOFF
            REQUIREMENT_TYPE ANY
          ACCEPT
```

```
        EXIT
      END_TALK
END_TABLE
```

DAQ_REQUIREMENT invokes the the appropriate input module's requirement handler, i.e. DAQ_INPUT's requirement handler.

ADD <requirement name> is used to indicate that the following parameters will define one requirement labelled <requirement name>. This name has meaning only in the context of the current process and can be used in that process to display the values of the parameters that define it. The string in quotes that follows this statement is also used only for display purposes and is intended to be a description of the requirement.

EVENT_TYPE determines the event/record type of the requirement. The event/record type is used to differentiate between real and calibration event records, begin run records, comment records, end run records, etc. The parameters this statement takes are described in C$INC:RECTYP.INC.

To allow for selecting a list of EVENT_TYPEs, LOWER_EVENT_BOUND and UPPER_EVENT_BOUND specify an inclusive range of event/record types. The ordering of the record type parameters is also defined by C$INC:RECTYP.INC.

For real event records, the range of statements TRIGGER_MASK... through the OK statement is used to specify the list of valid level 0,1,2,or 3 triggers to select on, where the level is specified by the /LEVEL qualifier. The correspondence between trigger names and bits in the trigger mask will then be calculated from the list of selected names and the TAGC bank that was downloaded at begin run time. Note that the process' program execution will stop if this region of the trigger table asks for a trigger that is undefined in the trigger section of the table. At the moment, the trigger parser ignores the level 4 section of the table so that this type of error is not protected against.

VETO_MASK statements work like TRIGGER_MASK statements except that the list of triggers are used to reject events. If the logical .AND. of the veto mask and the event's mask results in any bit being set the event will not be passed to the consumer regardless of the trigger mask match. The VETO_MASK/DEFA=ALLOFF statement specifies that no triggers will veto this requirement.

Again for real event records, the value of the REQUIREMENT_TYPE parameter determines what logic is used in comparing the event trigger mask to the requirement trigger mask. If ANY is specified the event will pass if the logical .AND. of the requirement mask and the event's mask results in any bit being set. If ALL is specified the event will pass if the logical .AND. of the requirement mask and the event's mask results in an exact match of the requirement mask.

SAMPLING_FREQUENCY, only relevant for VIP requirements, specifies the percentage of passed events of this classification that this Consumer wishes to receive.

FREQUENCY_TYPE, also only relevant for VIP requirements, describes whether the SAMPLING_FREQUENCY is an upper limit, a lower limit, or an exact fraction. If LT is specified it is an upper limit. If GT is specified it is a lower limit. If EQ is specified it is an exact fraction.

8 APPENDIX I - SAMPLE PHYSICS TABLE (28$8)

```
! Parsed :PHYSICS_V28$8.TXT                              11-MAR-1989:15:14:46.04
!
!       Trigger tables for physics running are named PHYSICS_VN$M where
! N is the major and M is the minor version.
!
!            This table is PHYSICS_V28$8.  It is derived from TEST_V28$5.  It
!       is meant to be run under low luminosity conditions .
!
!            This table differs from PHYSICS_V28$5 in that:
!       Level 1 Forward Muons have their rate limiting removed
!
! This table contains the following triggers:
!
!   Level 0     BBC_INTIME_INHIBIT              BBC East*West*.not.MR_COUNTERS
!
!   Level 1     JET_1_18                        1 GeV STT, 18 total
!               CENTRAL_ELECTRON_3_3_V3         3 GeV STT, 3 total in CEM
!               PHOTON_4_6_V2                   4 GeV STT, 6 total (CEM+PEM+FEM)
!               CENTRAL_ELECTRON_6_6_V2         6 GeV STT, 6 GeV total in CEM
!               CENTRAL_MUON_3                  3 GeV "Brass" Central Muon
!               FMU_100_100_100MILLIHZ          "100%" FMu rate limited at .1Hz
!               BBC_INTIME_50MILLIHZ            BBC East*West, rate limited
!               BBC_INTIME_YMON                 BBC East*West for YMON only
!
!   Level 2     BBC_INTIME_PREREQ_V9            Rate-limited Min. bias from L1
!               BBC_INTIME_YMON                 Min. bias for YMON's eyes only
!               JET_60                          60 GeV clusters, unprescaled
!               JET_40                          40 GeV clusters, prescaled x30
!               JET_20                          20 GeV clusters, prescaled x300
!               TRIJET_20                       Three clusters >20 GeV
!               TOTAL_ET_120                    >120 GeV Et total
!               PHOTON_CENTRAL_EMC_23           Central EM clust Single photon
!               PHOTON_CENTRAL_EMC_10_V1        Prescaled 10 GeV single photon
!               PHOTON_GAS_23                   Plug/forward EM clust photon
!               PHOTON_GAS_15_TOTAL_ET_50       Plug/forward EM clust photon
!               ELECTRON_EMC_12_6_PREREQ_V3     EM clust electron
!               ELECTRON_EMC_7_4PT8_PREREQ_V1   Prescaled 7 GeV electron
!               CENTRAL_MUON_9PT2               Gold central muon
!               MISSING_ET_25_TEX_8_NOT_FWD     Missing Et with Texas tower
!                       filter  and leading cluster not in forward calorimeter
!               MISSING_ET_30_L1PHOTON          Missing-Et+Level 1 photon
!               DIELECTRON_EMC_5_GEV_V2         EM clust di-electrons
!               DIPHOTON_EMC_10_V2              EM clust di-photons
!               DIMUON_CENTRAL_3                2 gold central muons
!               ELECTRON_EMC_5_CMU_3            EM clust E-mu events
!               FMU_100_100_100MILLIHZ          Forward muon
!               TAU_20_9PT2_V2                  Inclusive Tau's at 20 Gev with
!                                               back to back cut
!               DITAU_10_4PT8                   Di-Tau at 10 Gev
!               TAU_10_4PT8_ELECTRON_5_V2       Tau + Electron at 10,5 Gev
!       N.B.: The Tau+ Electron trigger must go after the Electron 12 trigger
!             and the Tau 20 trigger.  It also must be before the Tau 30
!             trigger.  Also, the electron-7 trigger must be after electron-12.
!               (these triggers use the highest-Et tau and electron, which use
```

```
!                the *2nd* Pt cut in trigger table order.   AAAARRRGGHH!)
!               TAU_10_4PT8_GAS_PHOTON_10_V1     Tau + Photon at 10,10 Gev
!               TAU_10_4PT8_CENTRAL_PHOTON_10_V1   Tau + Photon at 10,10
!               TAU_10_4PT8_MISSING_20_V2        Tau + Missing at 10,20 Gev
!               TAU_10_4PT8_MUON_3_V1            Tau + Muon at 10,3 Gev
!               TAU_30_9PT2_V1                   Tau's w/o back to back cut
!
!   Level 3     VERIFY_CDF152            verify YBOS on input to L3
!               REFORMAT_ASM             assembler reformatting of TDCs
!               FASTER_DFCTRK            put DFCTRK in its own trigger
!               MISSING_ET_KDIJET_TALK   clean up level 2 missing-Et triggers
!               MISSING_ET_PHO_KDIJET            "       "       "
!               JET_60_CLEANUP           clean up level 2 jet triggers
!               JET_40_CLEANUP                   "       "       "
!               JET_20_CLEANUP                   "       "       "
!               TRIJET_20_CLEANUP                "       "       "
!               TOTAL_ET_120_CLEANUP_V1          "       "       "
!               CMU_FILT_V6              central muon
!               ELECTRON_CENTRAL_12_V5   central electron photon
!               ELECTRON_CENTRAL_7_V5    central electron photon
!               PHOTON_CENTRAL_NOLSHR_V6 central photon 23 GeV, no lshare cut
!               PHOTON_CENTRAL_NOLSHR_10 central photon 10 GeV, no lshare cut
!               PHOTON_CENTRAL_LSHR_V5   central photon  23 GeV, lshare = .2
!               PHOTON_CENTRAL_LSHR_10   central photon  10 GeV, lshare = .2
!               PHOTON_GAS_V2            gas photon 23 GeV using L3PHO
!               PHOTON_GAS_FOR_TOP       gas electron 15 GeV plus L2 total Et
!               DIPHOTON_V3              di photons
!               FORWARD_MUON_PR100_25_V7forward muons with NO vertex
!               TAU_10_MISSING_ET_15_V2 clean up level 2 TAU + missing Et
!               TAU_10_ELECTRON_5_V1     TAU + central electron
!               TAU_10_MUON_3_V1         TAU + central muon
!               TAU_10_GAS_PHOTON_10     TAU + plug photon
!               TAU_10_CENTRAL_PHOTON_10 TAU + central photon
!               TAU_20_V1                20 GeV inclusive tau, L2 dijet cut
!               TAU_30_V1                30 GeV inclusive tau, no dijet cut
!               BBC_INTIME_YMON_V4       YMON minbias stream
!               L3_OUTPUT                write print buffer to bank PBL3, and
!                                        list of banks output to tape
!
!-------------------------------------------------------------------------------

LEVEL 0

    TRIGGER BBC_INTIME_INHIBIT
        EXECUTE MAIN_RING_INHIBIT
        EXECUTE MAIN_RING_COUNTERS
        SELECT BBC_EAST
        SELECT BBC_WEST

!-------------------------------------------------------------------------------

LEVEL 1
    TRIGGER JET_1_18     ! For Jet triggers, total Et, missing Et,...
        SELECT  LEVEL1_CALORIMETRY_SINGLE_CRATE
```

```
        PARAMETER   CALORIMETER_SUMMER = 2
        PARAMETER   WFEM_TOWER_THRESHOLD  > 1. (GeV)
        PARAMETER   WPEM_TOWER_THRESHOLD  > 1. (GeV)
        PARAMETER   CEM_TOWER_THRESHOLD   > 1. (GeV)
        PARAMETER   EPEM_TOWER_THRESHOLD  > 1. (GeV)
        PARAMETER   EFEM_TOWER_THRESHOLD  > 1. (GeV)
        PARAMETER   WFHAD_TOWER_THRESHOLD > 1. (GeV)
        PARAMETER   WPHAD_TOWER_THRESHOLD > 1. (GeV)
        PARAMETER   CHAD_TOWER_THRESHOLD  > 1. (GeV)
        PARAMETER   EPHAD_TOWER_THRESHOLD > 1. (GeV)
        PARAMETER   EFHAD_TOWER_THRESHOLD > 1. (GeV)
        CUT         EM_ET     > 18. (GeV)
        CUT         HADRON_ET > 18. (GeV)
        CUT         TOTAL_ET  > 18. (GeV)

TRIGGER CENTRAL_ELECTRON_3_3_V3     ! For di-lepton triggers, mainly
    SELECT  LEVEL1_CALORIMETRY_SINGLE_CRATE
        PARAMETER   CALORIMETER_SUMMER = 0
        PARAMETER   WFEM_TOWER_THRESHOLD  > 51. (GeV)
        PARAMETER   WPEM_TOWER_THRESHOLD  > 51. (GeV)
        PARAMETER   CEM_TOWER_THRESHOLD   >  3. (GeV)
        PARAMETER   EPEM_TOWER_THRESHOLD  > 51. (GeV)
        PARAMETER   EFEM_TOWER_THRESHOLD  > 51. (GeV)
        PARAMETER   WFHAD_TOWER_THRESHOLD > 51. (GeV)
        PARAMETER   WPHAD_TOWER_THRESHOLD > 51. (GeV)
        PARAMETER   CHAD_TOWER_THRESHOLD  > 51. (GeV)
        PARAMETER   EPHAD_TOWER_THRESHOLD > 51. (GeV)
        PARAMETER   EFHAD_TOWER_THRESHOLD > 51. (GeV)
        CUT         EM_ET     >   3.00 (GeV)
        CUT         HADRON_ET > 511.75 (GeV)
        CUT         TOTAL_ET  > 511.75 (GeV)

TRIGGER PHOTON_4_6_V2       ! For plug, forward electrons, high-Et photons
    SELECT  LEVEL1_CALORIMETRY_SINGLE_CRATE
        PARAMETER   CALORIMETER_SUMMER = 1
        PARAMETER   WFEM_TOWER_THRESHOLD  >  4. (GeV)
        PARAMETER   WPEM_TOWER_THRESHOLD  >  4. (GeV)
        PARAMETER   CEM_TOWER_THRESHOLD   >  4. (GeV)
        PARAMETER   EPEM_TOWER_THRESHOLD  >  4. (GeV)
        PARAMETER   EFEM_TOWER_THRESHOLD  >  4. (GeV)
        PARAMETER   WFHAD_TOWER_THRESHOLD > 51. (GeV)
        PARAMETER   WPHAD_TOWER_THRESHOLD > 51. (GeV)
        PARAMETER   CHAD_TOWER_THRESHOLD  > 51. (GeV)
        PARAMETER   EPHAD_TOWER_THRESHOLD > 51. (GeV)
        PARAMETER   EFHAD_TOWER_THRESHOLD > 51. (GeV)
        CUT         EM_ET     >   6.00 (GeV)
        CUT         HADRON_ET > 511.75 (GeV)
        CUT         TOTAL_ET  > 511.75 (GeV)

TRIGGER CENTRAL_ELECTRON_6_6_V2     ! For inclusive central electrons
    SELECT  LEVEL1_CALORIMETRY_SINGLE_CRATE
        PARAMETER   CALORIMETER_SUMMER = 3
        PARAMETER   WFEM_TOWER_THRESHOLD  > 51. (GeV)
        PARAMETER   WPEM_TOWER_THRESHOLD  > 51. (GeV)
```

```
            PARAMETER   CEM_TOWER_THRESHOLD   >  6. (GeV)
            PARAMETER   EPEM_TOWER_THRESHOLD  > 51. (GeV)
            PARAMETER   EFEM_TOWER_THRESHOLD  > 51. (GeV)
            PARAMETER   WFHAD_TOWER_THRESHOLD > 51. (GeV)
            PARAMETER   WPHAD_TOWER_THRESHOLD > 51. (GeV)
            PARAMETER   CHAD_TOWER_THRESHOLD  > 51. (GeV)
            PARAMETER   EPHAD_TOWER_THRESHOLD > 51. (GeV)
            PARAMETER   EFHAD_TOWER_THRESHOLD > 51. (GeV)
            CUT         EM_ET     >   6.00 (GeV)
            CUT         HADRON_ET > 511.75 (GeV)
            CUT         TOTAL_ET  > 511.75 (GeV)

    TRIGGER CENTRAL_MUON_3              ! For inclusive central muons
        SELECT  CMU_LEVEL1
            PARAMETER   CMU_HITS >= 2 (Layers)
            CUT         CMU_LEVEL1_PT > 3. (GeV/c)
                                        ! choices are 2.,3.,4.,5.,10. (GeV/c)

    TRIGGER FMU_100_100_100MILLIHZ      ! For a little bit of Fmu
        SELECT  FMU_LEVEL1
            CUT         SINGLE_FMU_PT = 100. (%)
                                        ! choices are 50.,100.,300. (%)
            CUT         TWO_FMU_PT    = 100. (%)
                                        ! choices are 50.,100.,300. (%)

    TRIGGER BBC_INTIME_50MILLIHZ        ! Min. bias for pedestals, etc
        EXECUTE LEVEL1_RATE_LIMITING
            PARAMETER   BURST_LOAD_RATE = 0.050 (Hertz)
            PARAMETER   BURST_COUNT = 1
        SELECT BBC_EAST
        SELECT BBC_WEST

    TRIGGER BBC_INTIME_YMON
        EXECUTE LEVEL1_RATE_LIMITING
            PARAMETER   BURST_LOAD_RATE = 0.200 (Hertz)
            PARAMETER   BURST_COUNT = 1
        SELECT BBC_EAST
        SELECT BBC_WEST

!-------------------------------------------------------------------------------

LEVEL 2

    TRIGGER BBC_INTIME_PREREQ_V9                ! Min. bias plus L2 executions
        PREREQUISITE BBC_INTIME_50MILLIHZ
        EXECUTE CLUSTER_FINDER                  ! Cluster with EM or Hadron Et
            PARAMETER   CALORIMETER_SUMMER = 0
            PARAMETER   SEED_ET     > 3. (GeV)
            PARAMETER   SHOULDER_ET > 1. (GeV)
        EXECUTE STIFF_CLUSTER_FINDER            ! Cluster with CFT trks
            PARAMETER   CALORIMETER_SUMMER = 1
        EXECUTE EM_CLUSTER_FINDER               ! EM towers only
            PARAMETER   CALORIMETER_SUMMER = 1
            PARAMETER   EM_SEED_ET     > 4.0 (GeV)
```

```
        PARAMETER   EM_SHOULDER_ET > 3.6 (GeV)
    EXECUTE MUON_CLUSTER_FINDER              ! Cluster with muons
        PARAMETER   CALORIMETER_SUMMER = 2
        PARAMETER   CMU_MAP_VERSION = 1
        PARAMETER   CMU_PHI_MATCH = 1 (Wedges)
    EXECUTE LEVEL1_REPEAT                    ! Add up all towers > threshold
        PARAMETER   CALORIMETER_SUMMER = 3
        PARAMETER   EM_TOWER_THRESHOLD     > 1. (GeV)
        PARAMETER   HADRON_TOWER_THRESHOLD > 1. (GeV)

TRIGGER BBC_INTIME_YMON                      ! Min. bias for YMON only
    PREREQUISITE BBC_INTIME_YMON

TRIGGER JET_60                               ! High-Et jet trigger
    SELECT  JET
        PARAMETER   ET_THRESHOLD >= 60. (GeV)
        CUT         NUMBER_OF_JETS >= 1

TRIGGER JET_40                               ! Middle-Et jet trigger
    EXECUTE LEVEL2_PRESCALING
        PARAMETER   PRESCALE_FACTOR = 30
    SELECT  JET
        PARAMETER   ET_THRESHOLD >= 40. (GeV)
        CUT         NUMBER_OF_JETS >= 1

TRIGGER JET_20                               ! Low-Et jet trigger
    EXECUTE LEVEL2_PRESCALING
        PARAMETER   PRESCALE_FACTOR = 300
    SELECT  JET
        PARAMETER   ET_THRESHOLD >= 20. (GeV)
        CUT         NUMBER_OF_JETS >= 1

TRIGGER TRIJET_20                            ! Demand 3 jets > 20 GeV
    SELECT  JET
        PARAMETER   ET_THRESHOLD >= 20. (GeV)
        CUT         NUMBER_OF_JETS >= 3

TRIGGER TOTAL_ET_120                         ! Total Et > 120 GeV
    SELECT  TOTAL_ET
        CUT         TOTAL_ET >= 120. (GeV)

TRIGGER PHOTON_CENTRAL_EMC_23                ! Central photons/pi0s
    SELECT  EM_CLUSTER_PHOTON
        PARAMETER   TOTAL_ET_OVER_EM_ET <= 1.125    ! In Mercury-ELX PROM
        PARAMETER   CENTRAL_TOWERS <= 15            !  "       "       "
        PARAMETER   PLUG_TOWERS    <= 15            !  "       "       "
        PARAMETER   FORWARD_TOWERS <= 15            !  "       "       "
        PARAMETER   ETA_MIN = 0.0                   !  "       "       "
        PARAMETER   ETA_MAX = 4.25                  !  "       "       "
        PARAMETER   EM_ET_THRESHOLD >= 23. (GeV)
        CUT         NUMBER_OF_EM_CLUSTER_PHOTONS >= 1
    SELECT  SINGLE_CLUSTER_CUT               ! Leading photon in central
        PARAMETER   CLUSTER_TYPE = 7         ! high EM clustering photon
        PARAMETER   CLUSTER_QUANTITY = 22    ! |Yseed-Ycenter|
```

```
        PARAMETER   COMPARE_TYPE = 4          ! <=
        CUT         THRESHOLD = 4             ! 0-4 are central trigger towers


TRIGGER PHOTON_CENTRAL_EMC_10_V1              ! Central photons/pi0s /10
    EXECUTE LEVEL2_PRESCALING
        PARAMETER   PRESCALE_FACTOR = 10
    SELECT  EM_CLUSTER_PHOTON
        PARAMETER   TOTAL_ET_OVER_EM_ET <= 1.125     ! In Mercury-ELX PROM
        PARAMETER   CENTRAL_TOWERS <= 15             !  "       "       "
        PARAMETER   PLUG_TOWERS    <= 15             !  "       "       "
        PARAMETER   FORWARD_TOWERS <= 15             !  "       "       "
        PARAMETER   ETA_MIN = 0.0                    !  "       "       "
        PARAMETER   ETA_MAX = 4.25                   !  "       "       "
        PARAMETER   EM_ET_THRESHOLD >= 10. (GeV)
        CUT         NUMBER_OF_EM_CLUSTER_PHOTONS >= 1
    SELECT  SINGLE_CLUSTER_CUT                ! Leading photon in central
        PARAMETER   CLUSTER_TYPE = 7          ! high EM clustering photon
        PARAMETER   CLUSTER_QUANTITY = 22     ! |Yseed-Ycenter|
        PARAMETER   COMPARE_TYPE = 4          ! <=
        CUT         THRESHOLD = 4             ! 0-4 are central trigger towers

TRIGGER PHOTON_GAS_23                 ! Plug&forward electrons/photons/pi0s
    SELECT  EM_CLUSTER_PHOTON_2
        PARAMETER   TOTAL_ET_OVER_EM_ET <= 1.125     ! In Mercury-ELY PROM
        PARAMETER   CENTRAL_TOWERS <= 15             !  "       "       "
        PARAMETER   PLUG_TOWERS    <= 15             !  "       "       "
        PARAMETER   FORWARD_TOWERS <= 15             !  "       "       "
        PARAMETER   ETA_MIN = 1.05                   !  "       "       "
        PARAMETER   ETA_MAX = 4.25                   !  "       "       "
        PARAMETER   EM_ET_THRESHOLD >= 23. (GeV)
        CUT         NUMBER_OF_EM_CLUSTER_PHOTONS_2 >= 1

TRIGGER PHOTON_GAS_15_TOTAL_ET_50     ! "Top" trigger for  Plug&forward e+-
    PREREQUISITE PHOTON_4_6_V2        ! At least 4 GeV in one tower
    SELECT  TOTAL_ET                  ! Ask for total energy
        CUT         TOTAL_ET >= 50. (GeV)
    SELECT  EM_CLUSTER_PHOTON_2       ! Ask for a gas e/photon candidate
        PARAMETER   TOTAL_ET_OVER_EM_ET <= 1.125     ! In Mercury-ELY PROM
        PARAMETER   CENTRAL_TOWERS <= 15             !  "       "       "
        PARAMETER   PLUG_TOWERS    <= 15             !  "       "       "
        PARAMETER   FORWARD_TOWERS <= 15             !  "       "       "
        PARAMETER   ETA_MIN = 1.05                   !  "       "       "
        PARAMETER   ETA_MAX = 4.25                   !  "       "       "
        PARAMETER   EM_ET_THRESHOLD >= 15. (GeV)
        CUT         NUMBER_OF_EM_CLUSTER_PHOTONS_2 >= 1

TRIGGER ELECTRON_EMC_12_6_PREREQ_V3           ! Unprescaled high-Et electrons
    PREREQUISITE CENTRAL_ELECTRON_6_6_V2
    SELECT  EM_CLUSTER_ELECTRON
        PARAMETER   TOTAL_ET_OVER_EM_ET <= 1.125     ! In Mercury-ELX PROM
        PARAMETER   CENTRAL_TOWERS <= 15             !  "       "       "
        PARAMETER   ETA_MIN = 0.0                    !  "       "       "
        PARAMETER   ETA_MAX = 4.25                   !  "       "       "
```

```
        PARAMETER    EM_ET_THRESHOLD >= 12. (GeV)
        PARAMETER    TRACK_PT >= 6.0 (GeV/c)
                     ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)
        CUT          NUMBER_OF_EM_CLUSTER_ELECTRONS >= 1

TRIGGER ELECTRON_EMC_7_4PT8_PREREQ_V1        ! Low-Et electrons /4
    PREREQUISITE CENTRAL_ELECTRON_6_6_V2
    EXECUTE LEVEL2_PRESCALING
        PARAMETER    PRESCALE_FACTOR = 4
    SELECT  EM_CLUSTER_ELECTRON
        PARAMETER    TOTAL_ET_OVER_EM_ET <= 1.125     ! In Mercury-ELX PROM
        PARAMETER    CENTRAL_TOWERS <= 15             !  "       "       "
        PARAMETER    ETA_MIN = 0.0                    !  "       "       "
        PARAMETER    ETA_MAX = 4.25                   !  "       "       "
        PARAMETER    EM_ET_THRESHOLD >= 7. (GeV)
        PARAMETER    TRACK_PT >= 4.8 (GeV/c)
                     ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)
        CUT       NUMBER_OF_EM_CLUSTER_ELECTRONS >= 1

TRIGGER CENTRAL_MUON_9PT2                    ! Single central muons
    SELECT  CENTRAL_MUON
        PARAMETER    TRACK_PT >= 9.2 (GeV/c)
                     ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)
        PARAMETER    CALORIMETER_ET <= 511.5 (GeV)
        CUT          NUMBER_OF_CENTRAL_MUONS >= 1

TRIGGER MISSING_ET_25_TEX_8_NOT_FWD          ! Missing Et, after a few cuts
    SELECT  MISSING_ET
        CUT          MISSING_ET_SQUARED >= 625. (GeV**2)
    SELECT  CALOR_CLUSTER                    ! Cut out "Texas Towers":
        CUT          NUMBER_OF_CALOR_CLUSTERS >= 1
    SELECT  TEXAS_FILTER
        CUT          HIGH_ET_JET_MIN_EM_ET >= 8.0 (GeV)
    SELECT  SINGLE_CLUSTER_CUT               ! Leading cluster not forward:
        PARAMETER    CLUSTER_TYPE = 1        ! highest Et
        PARAMETER    CLUSTER_QUANTITY = 17   ! Yseed
        PARAMETER    COMPARE_TYPE = 5        ! >
        CUT          THRESHOLD = 9           ! (0-9 are forward West)
    SELECT  SINGLE_CLUSTER_CUT
        PARAMETER    CLUSTER_TYPE = 1        ! highest Et
        PARAMETER    CLUSTER_QUANTITY = 17   ! Yseed
        PARAMETER    COMPARE_TYPE = 6        ! <
        CUT          THRESHOLD = 32          ! (32-41 are forward East)

TRIGGER MISSING_ET_30_L1PHOTON               ! Missing Et, after a few cuts
    PREREQUISITE PHOTON_4_6_V2
    SELECT  MISSING_ET
        CUT          MISSING_ET_SQUARED >= 900. (GeV**2)

TRIGGER DIELECTRON_EMC_5_GEV_V2
    SELECT  EM_CLUSTER_ELECTRON
        PARAMETER    TOTAL_ET_OVER_EM_ET <= 1.125     ! In Mercury-ELX PROM
        PARAMETER    CENTRAL_TOWERS <= 15             !  "       "       "
        PARAMETER    ETA_MIN = 0.0                    !  "       "       "
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```
        PARAMETER   ETA_MAX = 4.25                    !  "       "       "
        PARAMETER   EM_ET_THRESHOLD >= 5.0 (GeV)
        PARAMETER   TRACK_PT >= 4.8 (GeV/c)
                    ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)
        CUT         NUMBER_OF_EM_CLUSTER_ELECTRONS >= 2

TRIGGER DIPHOTON_EMC_10_V2
    SELECT  EM_CLUSTER_PHOTON
        PARAMETER   TOTAL_ET_OVER_EM_ET <= 1.125     ! In Mercury-ELX PROM
        PARAMETER   CENTRAL_TOWERS <= 15             !  "       "       "
        PARAMETER   PLUG_TOWERS    <= 15             !  "       "       "
        PARAMETER   FORWARD_TOWERS <= 15             !  "       "       "
        PARAMETER   ETA_MIN = 0.0                    !  "       "       "
        PARAMETER   ETA_MAX = 4.25                   !  "       "       "
        PARAMETER   EM_ET_THRESHOLD >= 10. (GeV)
        CUT         NUMBER_OF_EM_CLUSTER_PHOTONS >= 2

TRIGGER DIMUON_CENTRAL_3
    SELECT  CENTRAL_MUON
        PARAMETER   TRACK_PT >= 3.0 (GeV/c)
                    ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)
        PARAMETER   CALORIMETER_ET <= 511.5 (GeV)
        CUT         NUMBER_OF_CENTRAL_MUONS >= 2

TRIGGER ELECTRON_EMC_5_CMU_3
    SELECT  EM_CLUSTER_ELECTRON
        PARAMETER   TOTAL_ET_OVER_EM_ET <= 1.125     ! In Mercury-ELX PROM
        PARAMETER   CENTRAL_TOWERS <= 15             !  "       "       "
        PARAMETER   ETA_MIN = 0.0                    !  "       "       "
        PARAMETER   ETA_MAX = 4.25                   !  "       "       "
        PARAMETER   EM_ET_THRESHOLD >= 5.0 (GeV)
        PARAMETER   TRACK_PT >= 4.8 (GeV/c)
                    ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)
        CUT         NUMBER_OF_EM_CLUSTER_ELECTRONS >= 1
    SELECT  CENTRAL_MUON
        PARAMETER   TRACK_PT >= 3.0 (GeV/c)
                    ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)
        PARAMETER   CALORIMETER_ET <= 511.5 (GeV)
        CUT         NUMBER_OF_CENTRAL_MUONS >= 1

TRIGGER FMU_100_100_100MILLIHZ
    PREREQUISITE FMU_100_100_100MILLIHZ

TRIGGER TAU_20_9PT2_V2
    SELECT TAU
        PARAMETER   EM_ET_OVER_TOTAL_ET <= 0.890625    ! Fixed cuts
        PARAMETER   CENTRAL_TOWERS <= 2                ! in Mercury-TAU PROM
        PARAMETER   ETA_MIN = 0.0
        PARAMETER   ETA_MAX = 4.25
        PARAMETER   ET_THRESHOLD >= 20.0 (GeV)     ! Selectable cuts
        PARAMETER   TRACK_PT >= 9.2 (GeV/c)
                    ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)
        CUT         NUMBER_OF_TAUS >= 1
    SELECT TWO_CLUSTER_CUT
```

```
        PARAMETER   CLUSTER1_TYPE=1                  ! Highest Et Cluster
        PARAMETER   CLUSTER2_TYPE=2                  ! 2nd Highest Et Cluster
        PARAMETER   CLUSTER_QUANTITY=18              ! Phiseed
        PARAMETER   COMPARE_TYPE=6                   ! Less than
        PARAMETER   OPERATION=3                      ! Subtract with Abs
        CUT         THRESHOLD=11     ! Trigger is Delta phi less than 11

TRIGGER DITAU_10_4PT8
    SELECT TAU
        PARAMETER   EM_ET_OVER_TOTAL_ET <= 0.890625     ! Fixed cuts
        PARAMETER   CENTRAL_TOWERS <= 2                 ! in Mercury-TAU PROM
        PARAMETER   ETA_MIN = 0.0
        PARAMETER   ETA_MAX = 4.25
        PARAMETER   ET_THRESHOLD >= 10.0 (GeV)      ! Selectable cuts
        PARAMETER   TRACK_PT >= 4.8 (GeV/c)
                    ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)
        CUT         NUMBER_OF_TAUS >= 2

TRIGGER TAU_10_4PT8_ELECTRON_5_V2
    SELECT TAU
        PARAMETER   EM_ET_OVER_TOTAL_ET <= 0.890625     ! Fixed cuts
        PARAMETER   CENTRAL_TOWERS <= 2                 ! in Mercury-TAU PROM
        PARAMETER   ETA_MIN = 0.0
        PARAMETER   ETA_MAX = 4.25
        PARAMETER   ET_THRESHOLD >= 10.0 (GeV)      ! Selectable cuts
        PARAMETER   TRACK_PT >= 4.8 (GeV/c)
                    ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)
        CUT         NUMBER_OF_TAUS >= 1
    SELECT  EM_CLUSTER_ELECTRON
        PARAMETER   TOTAL_ET_OVER_EM_ET <= 1.125    ! In Mercury-ELX PROM
        PARAMETER   CENTRAL_TOWERS <= 15            !  "       "       "
        PARAMETER   ETA_MIN = 0.0                   !  "       "       "
        PARAMETER   ETA_MAX = 4.25                  !  "       "       "
        PARAMETER   EM_ET_THRESHOLD >= 5.0 (GeV)
        PARAMETER   TRACK_PT >= 4.8 (GeV/c)
                    ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)
        CUT         NUMBER_OF_EM_CLUSTER_ELECTRONS >= 1
    SELECT TWO_CLUSTER_CUT
        PARAMETER   CLUSTER1_TYPE=10                ! Highest Et Tau
        PARAMETER   CLUSTER2_TYPE=8                 ! Highest Et Electron
        PARAMETER   CLUSTER_QUANTITY=23             ! Distance between seeds
        PARAMETER   COMPARE_TYPE=5                  ! Greater than
        PARAMETER   OPERATION=3                     ! Dummy
        CUT         THRESHOLD=1      ! Trigger is Delta phi greater than 1
                                     ! OR Delta eta greater than 1

TRIGGER TAU_10_4PT8_GAS_PHOTON_10_V1
    SELECT TAU
        PARAMETER   EM_ET_OVER_TOTAL_ET <= 0.890625     ! Fixed cuts
        PARAMETER   CENTRAL_TOWERS <= 2                 ! in Mercury-TAU PROM
        PARAMETER   ETA_MIN = 0.0
        PARAMETER   ETA_MAX = 4.25
        PARAMETER   ET_THRESHOLD >= 10.0 (GeV)      ! Selectable cuts
        PARAMETER   TRACK_PT >= 4.8 (GeV/c)
```

```
                ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)
      CUT       NUMBER_OF_TAUS >= 1
   SELECT  EM_CLUSTER_PHOTON
      PARAMETER   TOTAL_ET_OVER_EM_ET <= 1.125    ! In Mercury-ELX PROM
      PARAMETER   CENTRAL_TOWERS <= 15            !       "       "
      PARAMETER   PLUG_TOWERS    <= 15            !       "       "
      PARAMETER   FORWARD_TOWERS <= 15            !       "       "
      PARAMETER   ETA_MIN = 0.0                   !       "       "
      PARAMETER   ETA_MAX = 4.25                  !       "       "
      PARAMETER   EM_ET_THRESHOLD >= 10. (GeV)
      CUT  NUMBER_OF_EM_CLUSTER_PHOTONS >= 1
   SELECT SINGLE_CLUSTER_CUT
      PARAMETER   CLUSTER_TYPE=7                  ! Highest Et Photon
      PARAMETER   CLUSTER_QUANTITY=22             ! |Yseed-Ycenter|
      PARAMETER   COMPARE_TYPE=5                  ! Greater than
      CUT         THRESHOLD=4     ! 0-4 are central trigger towers
   SELECT TWO_CLUSTER_CUT
      PARAMETER   CLUSTER1_TYPE=10                ! Highest Et Tau
      PARAMETER   CLUSTER2_TYPE=7                 ! Highest Et Photon
      PARAMETER   CLUSTER_QUANTITY=23             ! Distance between seeds
      PARAMETER   COMPARE_TYPE=5                  ! Greater than
      PARAMETER   OPERATION=3                     ! Dummy
      CUT         THRESHOLD=1     ! Trigger is Delta phi greater than 1
                                  ! OR Delta eta greater than 1

TRIGGER TAU_10_4PT8_CENTRAL_PHOTON_10_V1
   SELECT TAU
      PARAMETER   EM_ET_OVER_TOTAL_ET <= 0.890625    ! Fixed cuts
      PARAMETER   CENTRAL_TOWERS <= 2                ! in Mercury-TAU PROM
      PARAMETER   ETA_MIN = 0.0
      PARAMETER   ETA_MAX = 4.25
      PARAMETER   ET_THRESHOLD >= 10.0 (GeV)      ! Selectable cuts
      PARAMETER   TRACK_PT >= 4.8 (GeV/c)
                  ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)
      CUT         NUMBER_OF_TAUS >= 1
   SELECT  EM_CLUSTER_PHOTON
      PARAMETER   TOTAL_ET_OVER_EM_ET <= 1.125    ! In Mercury-ELX PROM
      PARAMETER   CENTRAL_TOWERS <= 15            !  "       "
      PARAMETER   PLUG_TOWERS    <= 15            !  "       "
      PARAMETER   FORWARD_TOWERS <= 15            !  "       "
      PARAMETER   ETA_MIN = 0.0                   !  "       "
      PARAMETER   ETA_MAX = 4.25                  !  "       "
      PARAMETER   EM_ET_THRESHOLD >= 10. (GeV)
      CUT  NUMBER_OF_EM_CLUSTER_PHOTONS >= 1
   SELECT SINGLE_CLUSTER_CUT
      PARAMETER   CLUSTER_TYPE=7                  ! Highest Et Photon
      PARAMETER   CLUSTER_QUANTITY=22             ! |Yseed-Ycenter|
      PARAMETER   COMPARE_TYPE=4                  ! Less than or equal to
      CUT         THRESHOLD=4     ! 0-4 are central trigger towers
   SELECT TWO_CLUSTER_CUT
      PARAMETER   CLUSTER1_TYPE=10                ! Highest Et Tau
      PARAMETER   CLUSTER2_TYPE=7                 ! Highest Et Photon
      PARAMETER   CLUSTER_QUANTITY=23             ! Distance between seeds
      PARAMETER   COMPARE_TYPE=5                  ! Greater than
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```
        PARAMETER   OPERATION=3                          ! Dummy
        CUT         THRESHOLD=1      ! Trigger is Delta phi greater than 1
                                     ! OR Delta eta greater than 1

TRIGGER TAU_10_4PT8_MISSING_20_V2
    SELECT TAU
        PARAMETER   EM_ET_OVER_TOTAL_ET <= 0.890625     ! Fixed cuts
        PARAMETER   CENTRAL_TOWERS <= 2                 ! in Mercury-TAU PROM
        PARAMETER   ETA_MIN = 0.0
        PARAMETER   ETA_MAX = 4.25
        PARAMETER   ET_THRESHOLD >= 10.0 (GeV)      ! Selectable cuts
        PARAMETER   TRACK_PT >= 4.8 (GeV/c)
                    ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)
        CUT         NUMBER_OF_TAUS >= 1
    SELECT  MISSING_ET
        CUT         MISSING_ET_SQUARED >= 400. (GeV**2)
    SELECT TWO_CLUSTER_CUT
        PARAMETER   CLUSTER1_TYPE=1                  ! Highest Et Cluster
        PARAMETER   CLUSTER2_TYPE=2                  ! 2nd Highest Et Cluster
        PARAMETER   CLUSTER_QUANTITY=18              ! Phiseed
        PARAMETER   COMPARE_TYPE=6                   ! Less than
        PARAMETER   OPERATION=3                      ! Subtract with Abs
        CUT         THRESHOLD=11     ! Trigger is Delta phi less than 11

TRIGGER TAU_10_4PT8_MUON_3_V1
    SELECT TAU
        PARAMETER   EM_ET_OVER_TOTAL_ET <= 0.890625     ! Fixed cuts
        PARAMETER   CENTRAL_TOWERS <= 2                 ! in Mercury-TAU PROM
        PARAMETER   ETA_MIN = 0.0
        PARAMETER   ETA_MAX = 4.25
        PARAMETER   ET_THRESHOLD >= 10.0 (GeV)      ! Selectable cuts
        PARAMETER   TRACK_PT >= 4.8 (GeV/c)
                    ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)
        CUT         NUMBER_OF_TAUS >= 1
    SELECT  CENTRAL_MUON
        PARAMETER   TRACK_PT >= 3.0 (GeV/c)
                    ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)
        PARAMETER   CALORIMETER_ET <= 511.5 (GeV)
        CUT         NUMBER_OF_CENTRAL_MUONS >= 1
    SELECT TWO_CLUSTER_CUT
        PARAMETER   CLUSTER1_TYPE=10                 ! Highest Et Tau
        PARAMETER   CLUSTER2_TYPE=12                 ! Highest Pt Muon
        PARAMETER   CLUSTER_QUANTITY=18              ! Y seeds
        PARAMETER   COMPARE_TYPE=5                   ! Greater than
        PARAMETER   OPERATION=3                      ! Subtract with Abs
        CUT         THRESHOLD=1      ! Trigger is Delta phi greater than 1

TRIGGER TAU_30_9PT2_V1
    SELECT TAU
        PARAMETER   EM_ET_OVER_TOTAL_ET <= 0.890625     ! Fixed cuts
        PARAMETER   CENTRAL_TOWERS <= 2                 ! in Mercury-TAU PROM
        PARAMETER   ETA_MIN = 0.0
        PARAMETER   ETA_MAX = 4.25
        PARAMETER   ET_THRESHOLD >= 30.0 (GeV)      ! Selectable cuts
```

```
            PARAMETER   TRACK_PT >= 9.2 (GeV/c)
                        ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)
            CUT         NUMBER_OF_TAUS >= 1

!-------------------------------------------------------------------------------

LEVEL 3

    TRIGGER VERIFY_CDF152                ! Verify YBOS on input to Level 3
        SELECT VERIFY152

    TRIGGER REFORMAT_ASM                 ! Reformat TDC data
        SELECT  REFORM
            PARAMETER   TALK_TO
                    REFFOR  FALSE        ! Don't use Fortran reformatting
                    REFASM  TRUE         ! Do use Assembler reformatting
            END_TALK

    TRIGGER FASTER_DFCTRK                ! Run DFCTRK in its own trigger
        SELECT DFCTRK                    ! Not-so-slow Damn Fast tracking

    TRIGGER MISSING_ET_KDIJET_TALK ! Clean up, apply a lower MET threshold
        PREREQUISITE MISSING_ET_25_TEX_8_NOT_FWD  ! Demand Level 2 MET
        EXECUTE CALORIMETRY
            PARAMETER   TALK_TO
                    PEM         OFF
                    VERSION     2
                    DBANK COMPONENT
                                CEM/DEAD/VERY_HOT/VERY_WIDE
                                CHA/DEAD/VERY_HOT/VERY_WIDE
                                WHA/DEAD/VERY_HOT/VERY_WIDE
                                PEM/DEAD/VERY_HOT/VERY_WIDE
                                PHA/DEAD/VERY_HOT/VERY_WIDE
                                FEM/DEAD/VERY_HOT/VERY_WIDE
                                FHA/DEAD/VERY_HOT/VERY_WIDE
                                EXIT
                          LEVEL3 ON
                        RETURN
                    SCALE COMP PHA/RESPONSE ON EXIT/MAIN
           END_TALK
        EXECUTE NCABLE                   ! Clean up PHA cable noise
        EXECUTE FHA_CABLE                ! Clean up FHA cable noise
        EXECUTE FILT_GAS                 ! Clean up TTs after FHA_CABLE
        EXECUTE JETCLU                   ! JET Clustering
        EXECUTE GETL3                    ! Compute MET,  vertex = 0
        SELECT  GETFLT                   ! Tower E thresholds:
            PARAMETER   TALK_TO          !   0.2/0.5/0.8 GeV cent/plug/forw
                        METDJ   15.0     ! Require MISSET>15 GeV with Dijets cut
            END_TALK                     ! (force L2 to make real cut)

    TRIGGER MISSING_ET_PHO_KDIJET   ! Clean up, then apply a lower MET threshold
        PREREQUISITE MISSING_ET_30_L1PHOTON ! Demand New Level 2 MET
        EXECUTE CALORIMETRY
        EXECUTE NCABLE                   ! Clean up PHA cable noise
```

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    EXECUTE FHA_CABLE                ! Clean up FHA cable noise
    EXECUTE FILT_GAS                 ! Clean up TTs after FHA_CABLE
    EXECUTE JETCLU                   ! JET Clustering
    EXECUTE GETL3                    ! Compute MET,  vertex = 0
    SELECT  GETFLT                   ! Tower E thresholds:
        PARAMETER   TALK_TO          !   0.2/0.5/0.8 GeV cent/plug/forw
                    METDJ   15.0     ! Require MISSET>15 GeV
        END_TALK                     ! (force L2 to make real cut)

TRIGGER JET_60_CLEANUP
    PREREQUISITE JET_60
    EXECUTE CALORIMETRY
    EXECUTE NCABLE                   ! Clean up PHA cable noise
    EXECUTE FHA_CABLE                ! Clean up FHA cable noise
    EXECUTE FILT_GAS                 ! Clean up TTs after FHA_CABLE
    EXECUTE JETCLU                   ! JET Clustering
    SELECT  Q3KFLT                   ! Setup jet cuts
        PARAMETER   TALK_TO
                    ET_CUT   45.0    ! Et of leading jet
                    JET_SUM  JET     ! Jets or summed Et
                    NUMBER    1.0    ! Number of jets
        END_TALK

TRIGGER JET_40_CLEANUP
    PREREQUISITE JET_40
    EXECUTE CALORIMETRY
    EXECUTE NCABLE                   ! Clean up PHA cable noise
    EXECUTE FHA_CABLE                ! Clean up FHA cable noise
    EXECUTE FILT_GAS                 ! Clean up TTs after FHA_CABLE
    EXECUTE JETCLU                   ! JET Clustering
    SELECT  Q3KFLT                   ! Setup jet cuts
        PARAMETER   TALK_TO
                    ET_CUT   30.0    ! Et of leading jet
                    JET_SUM  JET     ! Jets or summed Et
                    NUMBER    1.0    ! Number of jets
        END_TALK

TRIGGER JET_20_CLEANUP
    PREREQUISITE JET_20
    EXECUTE CALORIMETRY
    EXECUTE NCABLE                   ! Clean up PHA cable noise
    EXECUTE FHA_CABLE                ! Clean up FHA cable noise
    EXECUTE FILT_GAS                 ! Clean up TTs after FHA_CABLE
    EXECUTE JETCLU                   ! JET Clustering
    SELECT  Q3KFLT                   ! Setup jet cuts
        PARAMETER   TALK_TO
                    ET_CUT   10.0    ! Et of leading jet
                    JET_SUM  JET     ! Jets or summed Et
                    NUMBER    1.0    ! Number of jets
        END_TALK

TRIGGER TRIJET_20_CLEANUP
    PREREQUISITE TRIJET_20
    EXECUTE CALORIMETRY
```

```
    EXECUTE NCABLE                  ! Clean up PHA cable noise
    EXECUTE FHA_CABLE               ! Clean up FHA cable noise
    EXECUTE FILT_GAS                ! Clean up TTs after FHA_CABLE
    EXECUTE JETCLU                  ! JET Clustering
    SELECT  Q3KFLT                  ! Setup jet cuts
        PARAMETER   TALK_TO
                    ET_CUT   10.0   ! Et of leading jet
                    JET_SUM  JET    ! Jets or summed Et
                    NUMBER    3.0   ! Number of jets
        END_TALK

TRIGGER TOTAL_ET_120_CLEANUP_V1
    PREREQUISITE TOTAL_ET_120
    EXECUTE CALORIMETRY
    EXECUTE NCABLE                  ! Clean up PHA cable noise
    EXECUTE FHA_CABLE               ! Clean up FHA cable noise
    EXECUTE FILT_GAS                ! Clean up TTs after FHA_CABLE
    EXECUTE JETCLU                  ! JET Clustering
    SELECT  Q3KFLT                  ! Setup jet cuts
        PARAMETER   TALK_TO
                    ET_CUT   45.0   ! Et summed
                    JET_SUM  SUM    ! Jets or summed Et
                    TOW_ET     1.0   ! Min tower Et for sum
        END_TALK

TRIGGER CMU_FILT_V6                 ! CMU golden muon filter
    SELECT CMU_FILT
        PARAMETER    TALK_TO
                    PTMIN 11.       ! (GeV/c) Calorimeter E cut imposed
                    PTMAX 11.       ! only between PTMIN and PTMAX
                    CALOR 5.        ! (GeV) Calorimeter E cut
                    BIN 4           ! Minimum CFT bin required
        END_TALK                    ! Other cuts not specified (Dx, etc)

TRIGGER ELECTRON_CENTRAL_12_V6      ! Central electron
    PREREQUISITE ELECTRON_EMC_12_6_PREREQ_V3
    EXECUTE CALORIMETRY             ! See previous TALK_TO
    EXECUTE NCABLE                  ! Clean up PHA cable noise
    EXECUTE FHA_CABLE               ! Clean up FHA cable noise
    EXECUTE FILT_GAS                ! Clean up TTs after FHA_CABLE
    EXECUTE EMCLST
        PARAMETER   TALK_TO
                HADRON_EM   .125    ! Default Had/EM cut .1 changed  to .125
        END_TALK
    SELECT  CEPFLT                  ! Largely LSHR cut (not specified)
    SELECT  PTHARD                  ! Pt hardening with DF tracking
        PARAMETER       TALK_TO
                PT_CUT          6.0 ! GeV/c
                NUMBER_TRACKS   1
        END_TALK

TRIGGER ELECTRON_CENTRAL_7_V8
    PREREQUISITE ELECTRON_EMC_7_4PT8_PREREQ_V1
    EXECUTE CALORIMETRY             ! See previous TALK_TO
```

```
    EXECUTE NCABLE                  ! Clean up PHA cable noise
    EXECUTE FHA_CABLE               ! Clean up FHA cable noise
    EXECUTE FILT_GAS                ! Clean up TTs after FHA_CABLE
    EXECUTE EMCLST                  ! See previous TALK_TO
    SELECT  CEPFLT                  ! Largely LSHR cut (not specified)
        PARAMETER       TALK_TO
                ZCHI    -1.0:15.0   ! Chi_square cut
                LSHR    -5000.0:0.25 ! LSHR cut
                SHRT    0           ! Only accept strip chamber showers
                                    !  inside seed tower
                ETCU    7.0 ! Cluster Et
        END_TALK
    SELECT  PTHARD                  ! Pt hardening with DF tracking
        PARAMETER       TALK_TO
                PT_CUT          4.5 ! GeV/c
                NUMBER_TRACKS   1
        END_TALK

TRIGGER PHOTON_CENTRAL_NOLSHR_V6
    PREREQUISITE PHOTON_CENTRAL_EMC_23
    EXECUTE CALORIMETRY             ! See previous TALK_TO
    EXECUTE NCABLE                  ! Clean up PHA cable noise
    EXECUTE FHA_CABLE               ! Clean up FHA cable noise
    EXECUTE FILT_GAS                ! Clean up TTs after FHA_CABLE
    EXECUTE EMCLST                  ! See previous TALK_TO
    SELECT  L3PHO                   ! Central photon
        PARAMETER       TALK_TO
            1                       ! select border tower cut from menu
            999.                    ! set it to large no.
            2                       ! select halfwedge fraction from menu
            999.                    ! set it to large no.
            8                       ! select cone size from menu
            .7                      ! LARGE cone isolation cut
            9                       ! select value of cone cut
            .15                     ! 15 percent
            11                      ! select Et pass value from menu
            999.                    ! set it to large no.
            13                      ! select LSHR cut from menu
            999.                    ! set it large
            -1                      ! exit
        END_TALK

TRIGGER PHOTON_CENTRAL_NOLSHR_10
    PREREQUISITE PHOTON_CENTRAL_EMC_10_V1
    EXECUTE CALORIMETRY             ! See previous TALK_TO
    EXECUTE NCABLE                  ! Clean up PHA cable noise
    EXECUTE FHA_CABLE               ! Clean up FHA cable noise
    EXECUTE FILT_GAS                ! Clean up TTs after FHA_CABLE
    EXECUTE EMCLST                  ! See previous TALK_TO
    SELECT  L3PHO                   ! Central photon
        PARAMETER       TALK_TO
            1                       ! select border tower cut from menu
            999.                    ! set it to large no.
            2                       ! select halfwedge fraction from menu
```

```
            999.                        ! set it to large no.
            8                           ! select cone size from menu
            .7                          ! LARGE cone isolation cut
            9                           ! select value of cone cut
            .15                         ! 15 percent
            11                          ! select Et pass value from menu
            999.                        ! set it to large no.
            13                          ! select LSHR cut from menu
            999.                        ! set it large
            14                          ! select chi**2 cut from menu
            999.                        ! set it large to be safe
            -1                          ! exit
        END_TALK

TRIGGER PHOTON_CENTRAL_LSHR_V5
    PREREQUISITE PHOTON_CENTRAL_EMC_23
    EXECUTE CALORIMETRY                 ! See previous TALK_TO
    EXECUTE NCABLE                      ! Clean up PHA cable noise
    EXECUTE FHA_CABLE                   ! Clean up FHA cable noise
    EXECUTE FILT_GAS                    ! Clean up TTs after FHA_CABLE
    EXECUTE EMCLST                      ! See previous TALK_TO
    SELECT  L3PHO                       ! Central photon generous cone cut
        PARAMETER       TALK_TO
            1                           ! select border tower cut from menu
            999.                        ! set it to large no.
            2                           ! select halfwedge fraction from menu
            999.                        ! set it to large no.
            8                           ! select cone size from menu
            .4                          ! small cone isolation cut
            9                           ! select value of cone cut
            .15                         ! 15 percent
            11                          ! select Et pass value from menu
            999.                        ! set it to large no.
            13                          ! select LSHR cut value from menu
            .2                          ! set LSHR cut
            -1                          ! exit
        END_TALK

TRIGGER PHOTON_CENTRAL_LSHR_10
    PREREQUISITE PHOTON_CENTRAL_EMC_10_V1
    EXECUTE CALORIMETRY                 ! See previous TALK_TO
    EXECUTE NCABLE                      ! Clean up PHA cable noise
    EXECUTE FHA_CABLE                   ! Clean up FHA cable noise
    EXECUTE FILT_GAS                    ! Clean up TTs after FHA_CABLE
    EXECUTE EMCLST                      ! See previous TALK_TO
    SELECT  L3PHO                       ! Central photon generous cone cut
        PARAMETER       TALK_TO
            1                           ! select border tower cut from menu
            999.                        ! set it to large no.
            2                           ! select halfwedge fraction from menu
            999.                        ! set it to large no.
            8                           ! select cone size from menu
            .4                          ! small cone isolation cut
            9                           ! select value of cone cut
```

```
            .15                         ! 15 percent
            11                          ! select Et pass value from menu
            999.                        ! set it to large no.
            13                          ! select LSHR cut value from menu
            .2                          ! set LSHR cut
            14                          ! select chi**2 cut from menu
            25.                         ! set it large but not rediculous
            -1                          ! exit
        END_TALK

TRIGGER PHOTON_GAS_V2
    PREREQUISITE PHOTON_GAS_23
    EXECUTE CALORIMETRY                 ! See previous TALK_TO
    EXECUTE NCABLE                      ! Clean up PHA cable noise
    EXECUTE FHA_CABLE                   ! Clean up FHA cable noise
    EXECUTE FILT_GAS                    ! Clean up TTs after FHA_CABLE
    EXECUTE EMCLST                      ! See previous TALK_TO
    SELECT  L3PHO                       ! Central photon
        PARAMETER       TALK_TO
            1       !select border tower cut from menu
            999.    !set it to large no.
            2       !select halfwedge fraction from menu
            999.    !set it to large no.
            8       !select cone size from menu
            .7      !LARGE cone isolation cut
            9       !select value of cone cut
            999.    !no limit for Plug-Forward
            10      !select range in eta EXPLICITLY
            0       !lowest eta tower no., for FULL DETECTOR
            85      !highest eta tower no., for FULL DETECTOR
            11      !select Et pass value from menu
            7.5     !accept all triggers Et>7.5 GeV
            13      !select LSHR cut from menu
            999.    !set it large
            -1      !exit
        END_TALK

TRIGGER PHOTON_GAS_FOR_TOP
    PREREQUISITE PHOTON_GAS_15_TOTAL_ET_50
    EXECUTE CALORIMETRY                 ! See previous TALK_TO
    EXECUTE NCABLE                      ! Clean up PHA cable noise
    EXECUTE FHA_CABLE                   ! Clean up FHA cable noise
    EXECUTE FILT_GAS                    ! Clean up TTs after FHA_CABLE
    EXECUTE EMCLST                      ! See previous TALK_TO
    SELECT  L3PHO                       ! Central photon
        PARAMETER       TALK_TO
            1                           ! select border tower cut from menu
            999.                        ! set it to large no.
            2                           ! select halfwedge fraction from menu
            999.                        ! set it to large no.
            8                           ! select cone size from menu
            .7                          ! LARGE cone isolation cut
            9                           ! select value of cone cut
            999.                        ! no limit for Plug-Forward
```

```
            10                          ! select range in eta EXPLICITLY
            0                           ! lowest eta tower no., for FULL DETECTOR
            85                          ! highest eta tower no., for FULL DETECTOR
            11                          ! select Et pass value from menu
            7.5                         ! accept all triggers Et>7.5 GeV
            13                          ! select LSHR cut from menu
            999.                        ! set it large
            -1                          ! exit
        END_TALK

TRIGGER     DIPHOTON_V3
    PREREQUISITE DIPHOTON_EMC_10_V2
    EXECUTE CALORIMETRY                 ! See previous TALK_TO
    EXECUTE NCABLE                      ! Clean up PHA cable noise
    EXECUTE FHA_CABLE                   ! Clean up FHA cable noise
    EXECUTE FILT_GAS                    ! Clean up TTs after FHA_CABLE
    EXECUTE EMCLST                      ! See previous TALK_TO
    SELECT  L3_DIPHOTON                 ! L2 verification: Et >=10 GeV,
                                        ! total_Et_over_em_Et <=1.125

TRIGGER FORWARD_MUON_PR100_V7           ! No vertex calc.; no L1 prescale
    PREREQUISITE  FMU_100_100_100MILLIHZ
    EXECUTE FMDTE
    SELECT  FMTRK
        PARAMETER       TALK_TO
                FITS                    ! Pick fit-changing option
                0.05                    ! Nominal chamber resolution for fitting
                YES                     ! Use multiple scattering in the fit
                NO                      ! Don't use vertex in fit
                NO                      ! Don't use initial track angle in fit
        END_TALK

TRIGGER TAU_10_MISSING_ET_15_V2 ! Clean up, then apply a lower MET threshold
    PREREQUISITE TAU_10_4PT8_MISSING_20_V2  ! Demand Level 2 TAU + MET
    EXECUTE CALORIMETRY
    EXECUTE NCABLE                      ! Clean up PHA cable noise
    EXECUTE FHA_CABLE                   ! Clean up FHA cable noise
    EXECUTE FILT_GAS                    ! Clean up TTs after FHA_CABLE
    EXECUTE JETCLU                      ! JET Clustering
    EXECUTE GETL3                       ! Compute MET,  vertex = 0
    SELECT  GETFLT                      ! Tower E thresholds:
        PARAMETER   TALK_TO             !   0.2/0.5/0.8 GeV cent/plug/forw
                    MISSET   15.0       ! Require MISSET>15 GeV
        END_TALK                        ! (force L2 to make real cut)

TRIGGER TAU_10_ELECTRON_5_V1
    PREREQUISITE TAU_10_4PT8_ELECTRON_5_V2
    EXECUTE CALORIMETRY                 ! See previous TALK_TO
    EXECUTE NCABLE                      ! Clean up PHA cable noise
    EXECUTE FHA_CABLE                   ! Clean up FHA cable noise
    EXECUTE FILT_GAS                    ! Clean up TTs after FHA_CABLE
    EXECUTE EMCLST                      ! See previous TALK_TO
    SELECT  CEPFLT                      ! See previous TALK_TO, 7GEV ET
    SELECT  PTHARD                      ! Pt hardening with DF tracking
```

```
            PARAMETER       TALK_TO
                    PT_CUT          3.0 ! GeV/c
                    NUMBER_TRACKS   1
            END_TALK

    TRIGGER TAU_10_MUON_3_V1            ! 1st try at L3 electron-mu pairs
        PREREQUISITE TAU_10_4PT8_MUON_3_V1
        SELECT  PTHARD                  ! Pt hardening with DF tracking
            PARAMETER       TALK_TO
                    PT_CUT          3.0 ! GeV/c
                    NUMBER_TRACKS   2   !
            END_TALK

    TRIGGER TAU_10_GAS_PHOTON_10        ! 1st try at L3 tau + X filtering
        PREREQUISITE TAU_10_4PT8_GAS_PHOTON_10_V1
        EXECUTE CALORIMETRY             ! See previous TALK_TO
        EXECUTE NCABLE                  ! Clean up PHA cable noise
        EXECUTE FHA_CABLE               ! Clean up FHA cable noise
        EXECUTE FILT_GAS                ! Clean up TTs after FHA_CABLE
        EXECUTE JETCLU                  ! Invoke jet clustering
        SELECT  TAL3SL                  ! Matches JETCLU clusters to trigger
! Default cuts:
!           PARAMETER       TALK_TO
!                   ET_CUT       11.0   ! min. Et of matching JETCLU cluster
!                   JETMASS       6.0   ! max. mass of matching JETCLU cluster
!           END_TALK

    TRIGGER TAU_10_CENTRAL_PHOTON_10    ! 1st try at L3 tau + X filtering
        PREREQUISITE TAU_10_4PT8_CENTRAL_PHOTON_10_V1
        EXECUTE CALORIMETRY             ! See previous TALK_TO
        EXECUTE NCABLE                  ! Clean up PHA cable noise
        EXECUTE FHA_CABLE               ! Clean up FHA cable noise
        EXECUTE FILT_GAS                ! Clean up TTs after FHA_CABLE
        EXECUTE JETCLU                  ! Invoke jet clustering
        SELECT  TAL3SL                  ! Matches JETCLU clusters to trigger
!           PARAMETER       TALK_TO
!                   ET_CUT       11.0   ! min. Et of matching JETCLU cluster
!                   JETMASS       6.0   ! max. mass of matching JETCLU cluster
!           END_TALK

    TRIGGER TAU_20_V1                   ! 1st try at L3 inclusive tau filtering
        PREREQUISITE TAU_20_9PT2_V2
        EXECUTE CALORIMETRY             ! See previous TALK_TO
        EXECUTE NCABLE                  ! Clean up PHA cable noise
        EXECUTE FHA_CABLE               ! Clean up FHA cable noise
        EXECUTE FILT_GAS                ! Clean up TTs after FHA_CABLE
        EXECUTE JETCLU                  ! Invoke jet clustering
        SELECT  TAL3SL                  ! Matches JETCLU clusters to trigger
!           PARAMETER       TALK_TO
!                   BIG_ET_CUT    21.0  ! GeV cut on JETCLU Et of cluster
!                   BIG_JETMASS    5.0  ! Cut on mass from JETCLU
!           END_TALK

    TRIGGER TAU_30_V1                   ! 1st try at L3 inclusive tau filtering
```

```
        PREREQUISITE TAU_30_9PT2_V1
        EXECUTE CALORIMETRY                ! See previous TALK_TO
        EXECUTE NCABLE                     ! Clean up PHA cable noise
        EXECUTE FHA_CABLE                  ! Clean up FHA cable noise
        EXECUTE FILT_GAS                   ! Clean up TTs after FHA_CABLE
        EXECUTE JETCLU                     ! Invoke jet clustering
        SELECT  TAL3SL                     ! Matches JETCLU clusters to trigger
!           PARAMETER       TALK_TO
!                   BIG_ET_CUT    21.0   ! GeV cut on JETCLU Et of cluster
!                   BIG_JETMASS    5.0   ! Cut on mass from JETCLU
!           END_TALK

    TRIGGER BBC_INTIME_YMON_V4             ! YMON minbias stream
        PREREQUISITE BBC_INTIME_YMON
        SELECT VERTEX                      ! MUST GO AFTER ALL THE ABOVE TRIGGERS!
!           PARAMETER   TALK_TO            ! Wants real vertex
!                       VTVERT             ON
!                       BBCVTX             OFF
!                       Z_CUT              -200:200 ! cm
!                       CUT_LOGIC          ANY
!                       BBVX_TO_EVTA       NO
!           END_TALK
        EXECUTE CALORIMETRY                ! See previous TALK_TO
        EXECUTE NCABLE                     ! Clean up PHA cable noise
        EXECUTE FHA_CABLE                  ! Clean up FHA cable noise
        EXECUTE FILT_GAS                   ! Clean up TTs after FHA_CABLE
        EXECUTE GETL3                      ! Compute MET

    TRIGGER L3_OUTPUT
        EXECUTE L3PTBF                     ! Writes node print buffer to PBL3
        EXECUTE OUTPUT_BANKS
            PARAMETER   TALK_TO
                        OUTPUT_BANKS  CALL
                        OUTPUT_BANKS  CLSL
                        OUTPUT_BANKS  CALS
                        OUTPUT_BANKS  JETS
                        OUTPUT_BANKS  CEL3      ! made by CEPFLT
                        OUTPUT_BANKS  CTL3      ! made by DFCTRK
                        OUTPUT_BANKS  EVTA      ! made by vertex code
                        OUTPUT_BANKS  ETL3      ! made by GETL3
                        OUTPUT_BANKS  FMUE
                        OUTPUT_BANKS  FMCE
                        OUTPUT_BANKS  FMTE
                        OUTPUT_BANKS  FMSE
                        OUTPUT_BANKS  FMUS
                        OUTPUT_BANKS  FMUR
                        OUTPUT_BANKS  FMUL
                        OUTPUT_BANKS  PHL3
                        OUTPUT_BANKS  VTVZ
                        OUTPUT_BANKS  $L3E
                        OUTPUT_BANKS  $PHO
                        OUTPUT_BANKS  $ELI
                        OUTPUT_BANKS  $CP3
                        OUTPUT_BANKS  TL3D
```

```
            END_TALK
!
! The LEVEL 4 Key identifies VAX online Consumers.
! Note that program execution will stop if the trigger table asks
! for a trigger that is undefined for the current run, since the
! trigger parser ignores this section.
!
LEVEL 4

    CONSUMER DATA_LOGGER
        PARAMETER       TALK_TO DLOG_INPUT
            DAQ_REQUIREMENT
!
! This is the name that can be used to refer to this set of DAQ parameters
!
                ADD 'NON_EVENT_RECORDS'
                        'This requirement gets all nonevent records.'
                        LOWER_EVENT_BOUND BEGR
                        UPPER_EVENT_BOUND FEND
                        SAMPLING_FREQUENCY/PERCENT= '100.0'
                        FREQUENCY_TYPE EQ
                ACCEPT/VIP
!
                ADD 'EVENT_RECORDS'     ! Definitely a VIP consumer
                        'This requirement gets all event records.'
                        EVENT_TYPE EVNT
                        TRIGGER_MASK/LEVEL=2
                            BBC_INTIME_PREREQ_V9
! cut in L3                  JET_60
! cut in L3                  JET_40
! cut in L3                  JET_20
! cut in L3                  TRIJET_20
! cut in L3                  TOTAL_ET_120
! cut in L3                  PHOTON_CENTRAL_EMC_23
! cut in L3                  PHOTON_CENTRAL_EMC_10_V1
! cut in L3                  PHOTON_GAS_23
! cut in L3                  PHOTON_GAS_15_TOTAL_ET_50
! cut in L3                  ELECTRON_EMC_12_6_PREREQ_V3
! cut in L3                  ELECTRON_EMC_7_4PT8_PREREQ_V1
! cut in L3                  CENTRAL_MUON_9PT2
! cut in L3                  MISSING_ET_25_TEX_8_NOT_FWD
! cut in L3                  MISSING_ET_30_L1PHOTON
                            DIELECTRON_EMC_5_GEV_V2
! cut in L3                  DIPHOTON_EMC_10_V2
                            DIMUON_CENTRAL_3
                            ELECTRON_EMC_5_CMU_3
! cut in L3                  FMU_100_100_100MILLIHZ
! cut in L3                  TAU_20_9PT2_V2
                            DITAU_10_4PT8
! cut in L3                  TAU_10_4PT8_ELECTRON_5_V2
! cut in L3                  TAU_10_4PT8_GAS_PHOTON_10_V1
! cut in L3                  TAU_10_4PT8_CENTRAL_PHOTON_10_V1
! cut in L3                  TAU_10_4PT8_MISSING_20_V2
! cut in L3                  TAU_10_4PT8_MUON_3_V1
```

```
! cut in L3                    TAU_30_9PT2_V1
                            OK
                            TRIGGER_MASK/LEVEL=3
                                MISSING_ET_KDIJET_TALK
                                MISSING_ET_PHO_KDIJET
                                JET_60_CLEANUP
                                JET_40_CLEANUP
                                JET_20_CLEANUP
                                TRIJET_20_CLEANUP
                                TOTAL_ET_120_CLEANUP_V1
                                CMU_FILT_V6
                                ELECTRON_CENTRAL_12_V6
                                ELECTRON_CENTRAL_7_V8
                                PHOTON_CENTRAL_NOLSHR_V6
                                PHOTON_CENTRAL_NOLSHR_10
                                PHOTON_CENTRAL_LSHR_V5
                                PHOTON_CENTRAL_LSHR_10
                                PHOTON_GAS_V2
                                PHOTON_GAS_FOR_TOP
                                DIPHOTON_V3
                                FORWARD_MUON_PR100_V7
                                TAU_10_MISSING_ET_15_V2
                                TAU_10_ELECTRON_5_V1
                                TAU_10_MUON_3_V1
                                TAU_10_GAS_PHOTON_10
                                TAU_10_CENTRAL_PHOTON_10
                                TAU_20_V1
                                TAU_30_V1
                            OK
                            VETO_MASK/DEFA=ALLOFF
                            REQUIREMENT_TYPE ANY
                            SAMPLING_FREQUENCY/PERCENT= '100.0'
                            FREQUENCY_TYPE EQ
                    ACCEPT/VIP
                    EXIT
                END_TALK

    CONSUMER    STAGE0
        PARAMETER  TALK_TO DAQ_INPUT
            DAQ_REQUIREMENT
                ADD 'NON_EVENT_RECORDS'
                        'This requirement gets all nonevent records.'
                        LOWER_EVENT_BOUND BEGR
                        UPPER_EVENT_BOUND FEND
                        SAMPLING_FREQUENCY/PERCENT= '100.0'
                        FREQUENCY_TYPE EQ
                ACCEPT/VIP
!
                ADD 'EVENT_RECORDS'              ! Not a VIP consumer
                        'This requirement gets some event records.'
                        EVENT_TYPE EVNT
!
! Select on all level 2 triggers except for YMON path
!
```

```
                    TRIGGER_MASK/LEVEL=2
                        BBC_INTIME_PREREQ_V9
                        JET_60
                        JET_40
                        JET_20
                        TRIJET_20
                        TOTAL_ET_120
                        PHOTON_CENTRAL_EMC_23
                        PHOTON_CENTRAL_EMC_10_V1
                        PHOTON_GAS_23
                        PHOTON_GAS_15_TOTAL_ET_50
                        ELECTRON_EMC_12_6_PREREQ_V3
                        ELECTRON_EMC_7_4PT8_PREREQ_V1
                        CENTRAL_MUON_9PT2
                        MISSING_ET_25_TEX_8_NOT_FWD
                        MISSING_ET_30_L1PHOTON
                        DIELECTRON_EMC_5_GEV_V2
                        DIPHOTON_EMC_10_V2
                        DIMUON_CENTRAL_3
                        ELECTRON_EMC_5_CMU_3
                        FMU_100_100_100MILLIHZ
                        TAU_20_9PT2_V2
                        DITAU_10_4PT8
                        TAU_10_4PT8_ELECTRON_5_V2
                        TAU_10_4PT8_GAS_PHOTON_10_V1
                        TAU_10_4PT8_CENTRAL_PHOTON_10_V1
                        TAU_10_4PT8_MISSING_20_V2
                        TAU_10_4PT8_MUON_3_V1
                        TAU_30_9PT2_V1
                    OK
                    VETO/DEFA=ALLOFF
                    REQUIREMENT_TYPE ANY
            ACCEPT
            EXIT
        END_TALK
!
CONSUMER    YMON
    PARAMETER  TALK_TO DAQ_INPUT
        DAQ_REQUIREMENT
            ADD 'NON_EVENT_RECORDS'
                    'Non-Event Record Types'
                    LOWER_EVENT_BOUND BEGR
                    UPPER_EVENT_BOUND FEND
                    SAMPLING_FREQUENCY/PERCENT= '100.0'
                    FREQUENCY_TYPE EQ
            ACCEPT/VIP
!
            ADD 'EVENT_RECORDS'              ! Not a VIP consumer
                     'This requirement gets some event records.'
                    EVENT_TYPE EVNT
                    TRIGGER_MASK/LEVEL=2
                        BBC_INTIME_PREREQ_V9
                    OK
                    TRIGGER_MASK/LEVEL=3
```

```
                    BBC_INTIME_YMON_V4
                OK
                VETO/DEFA=ALLOFF
                REQUIREMENT_TYPE ANY
            ACCEPT
            EXIT
        END_TALK
END_TABLE
```

9 APPENDIX II - LIST OF TRIGGERS (as of March 20, 1989)

Level and Name.

0 ACCEPT	0 AUTOMATIC_ACCEPT
0 AUTOMATIC_ACCEPT_BBC_INHIBIT_MR	0 AUTO_ACCEPT_NO_MAIN_RING
0 BBC_INTIME	0 BBC_INTIME_EAST
0 BBC_INTIME_INHIBIT	0 BBC_INTIME_MR_INHIBIT
0 BBC_INTIME_WEST	0 CDT_2
0 CFT_L0_L2	0 CFT_LAYER2
0 CFT_L_ZERO	0 CTC_LAYER_0_2
0 EMPTY_CROSSING	0 L0_AUTOMATIC_ACCEPT
0 NO_MAIN_RING	0 SACSIF
1 AUTOMATIC_ACCEPT	1 BBC_INTIME
1 BBC_INTIME_100MILLIHZ	1 BBC_INTIME_10MILLIHZ
1 BBC_INTIME_3HZ	1 BBC_INTIME_50MILLIHZ
1 BBC_INTIME_60MILLIHZ	1 BBC_INTIME_CFT
1 BBC_INTIME_RATE_LIMITED	1 BBC_INTIME_YMON
1 CAL_TEST_1_1_A	1 CAL_TEST_1_1_A_REJECT
1 CAL_TEST_1_1_B	1 CAL_TEST_1_1_B_REJECT
1 CAL_TEST_1_1_C	1 CAL_TEST_1_1_C_REJECT
1 CAL_TEST_1_1_D	1 CAL_TEST_1_1_D_REJECT
1 CEM_PEM_10_10	1 CEM_PEM_3_3
1 CENTRAL_ELECTRON_12_12	1 CENTRAL_ELECTRON_12_12_BBC
1 CENTRAL_ELECTRON_2PT6_2	1 CENTRAL_ELECTRON_3_3_BBC
1 CENTRAL_ELECTRON_3_3	1 CENTRAL_ELECTRON_3_3_V2
1 CENTRAL_ELECTRON_3_3_V3	1 CENTRAL_ELECTRON_6_6
1 CENTRAL_ELECTRON_6_6_V2	1 CENTRAL_MUON_10
1 CENTRAL_MUON_10_BBC	1 CENTRAL_MUON_2
1 CENTRAL_MUON_3	1 CENTRAL_MUON_4
1 CENTRAL_MUON_5	1 CENTRAL_MUON_5_BBC
1 CFT_L_ONE	1 CMU_5
1 DIMUON_2	1 DIMUON_2_BBC
1 DIMUON_2_RATE_LIMITED	1 ELECTRON_CENTRAL_5_10
1 EMPTY_CROSSING	1 FHADE_1_1
1 FHADE_1_10	1 FHADE_1_20
1 FHADE_1_5	1 FHADW_1_1
1 FHADW_1_10	1 FHADW_1_20
1 FHADW_1_5	1 FHA_WEST_CRATE_1_20
1 FHA_WEST_CRATE_1_20__V2	1 FHA_WEST_CRATE_1_5
1 FHA_WEST_CRATE_1_5__V2	1 FMU_100
1 FMU_100_100	1 FMU_100_100_100MILLIHZ
1 FMU_100_100_25MILLIHZ	1 FMU_100_25MILLIHZ
1 FMU_100_50MILLIHZ	1 FMU_100_V2
1 FMU_300	1 FMU_300_BBC
1 FMU_300_BBC_RATE_LIMITED	1 FMU_DIMUON
1 GAS_ELECTRON_15_15	1 GAS_ELECTRON_1_20
1 GAS_ELECTRON_1_20_BBC	1 GAS_ELECTRON_2_20
1 JET_1_15	1 JET_1_18
1 JET_1_20	1 JET_1_20_BBC
1 JET_1_40	1 JET_1_45
1 JET_1_45_NO_FHA	1 JET_1_50
1 JET_1_50_BBC	1 JET_1_50_NO_FHA
1 JET_1_80	1 PHADE_1_1
1 PHADE_1_10	1 PHADE_1_20
1 PHADE_1_5	1 PHADW_1_1

1 PHADW_1_10	1 PHADW_1_20
1 PHADW_1_5	1 PHOTON_1_1
1 PHOTON_2_7	1 PHOTON_2_7_BBC
1 PHOTON_2_7_V2	1 PHOTON_4_6
1 PHOTON_4_6_V2	1 REJECT
2 AUTOMATIC_ACCEPT	2 AUTOMATIC_ACCEPT_2
2 AUTOMATIC_ACCEPT_CAL_MU_L1_CLUST	2 AUTOMATIC_ACCEPT_CAL_CLUSTER
2 AUTOMATIC_ACCEPT_CLUSTER_FINDING	2 AUTOMATIC_ACCEPT_CMU_V1
2 AUTOMATIC_ACCEPT_CMU_V2	2 AUTOMATIC_ACCEPT_PRESCALE_1000
2 AUTOMATIC_ACCEPT_PRESCALE_100	2 AUTOMATIC_ACCEPT_PRESCALE_10000
2 AUTOMATIC_ACCEPT_WCLUSTERS	2 AUTOMATIC_REJECT
2 AUTO_ACCEPT_2	2 AUTO_ACCEPT_PSCL_10000
2 AUTO_CMU_PULSER_ACCEPT	2 BBC_INTIME
2 BBC_INTIME_AUTO_ACCEPT	2 BBC_INTIME_CAL_MU_L1_CLUSTERING
2 BBC_INTIME_JET_TEST	2 BBC_INTIME_JET_TEST2
2 BBC_INTIME_PREREQ	2 BBC_INTIME_PREREQ_V1
2 BBC_INTIME_PREREQ_V10	2 BBC_INTIME_PREREQ_V2
2 BBC_INTIME_PREREQ_V3	2 BBC_INTIME_PREREQ_V4
2 BBC_INTIME_PREREQ_V6	2 BBC_INTIME_PREREQ_V7
2 BBC_INTIME_PREREQ_V8	2 BBC_INTIME_PREREQ_V9
2 BBC_INTIME_YMON	2 CENTRAL_ELECTRON_7
2 CENTRAL_MUON_11	2 CENTRAL_MUON_11_PRESCALE_3
2 CENTRAL_MUON_13	2 CENTRAL_MUON_13_90PCT
2 CENTRAL_MUON_2PT5	2 CENTRAL_MUON_3
2 CENTRAL_MUON_3.5	2 CENTRAL_MUON_4PT8
2 CENTRAL_MUON_6_PRESCALE_5	2 CENTRAL_MUON_7
2 CENTRAL_MUON_7_PRESCALE_10	2 CENTRAL_MUON_8_PRESCALE_5
2 CENTRAL_MUON_9PT2	2 CENTRAL_MUON_LOW
2 CENTRAL_MUON_PULSER	2 CENTRAL_MUON_TEST
2 CFT_MIN_BIAS	2 DIELECTRON_5
2 DIELECTRON_5_V2	2 DIELECTRON_5_V3
2 DIELECTRON_5_V4	2 DIELECTRON_5_V5
2 DIELECTRON_EMC_5	2 DIELECTRON_EMC_5_GEV
2 DIELECTRON_EMC_5_GEV_V2	2 DIELECTRON_EMC_6_90PCT
2 DIMUON_1_GOLD	2 DIMUON_2
2 DIMUON_2_GOLD	2 DIMUON_5
2 DIMUON_5_V1	2 DIMUON_5_V2
2 DIMUON_6_90PCT	2 DIMUON_CENTRAL_3
2 DIMUON_CENTRAL_4	2 DIPHOTON_10
2 DIPHOTON_10_V2	2 DIPHOTON_10_V3
2 DIPHOTON_10_V4	2 DIPHOTON_EMC_10
2 DIPHOTON_EMC_10_V2	2 DITAU_10_4PT8
2 ELECTRON_12_6	2 ELECTRON_12_6_V2
2 ELECTRON_12_6_V3	2 ELECTRON_12_6_V4
2 ELECTRON_12_6_V5	2 ELECTRON_5
2 ELECTRON_5_MUON_5	2 ELECTRON_5_MUON_5_V2
2 ELECTRON_5_MUON_5_V3	2 ELECTRON_5_MUON_5_V4
2 ELECTRON_5_MUON_5_V5	2 ELECTRON_5_PHOTON_10
2 ELECTRON_7	2 ELECTRON_7_3.5
2 ELECTRON_7_3_PRESCALE_20_V5	2 ELECTRON_7_3_PRESCALE_20
2 ELECTRON_7_3_PRESCALE_20_V2	2 ELECTRON_7_3_PRESCALE_20_V3
2 ELECTRON_7_3_PRESCALE_20_V4	2 ELECTRON_7_6_PRESCALE_2
2 ELECTRON_7_PRESCALE_2	2 ELECTRON_EMC_12_6
2 ELECTRON_EMC_12_6_PREREQ	2 ELECTRON_EMC_12_6_PREREQ_V2

2 ELECTRON_EMC_12_6_PREREQ_V3
2 ELECTRON_EMC_12_6_V2
2 ELECTRON_EMC_5_CMU_3
2 ELECTRON_EMC_5_CMU_4
2 ELECTRON_EMC_5_CMU_5
2 ELECTRON_EMC_5_CMU_5_V2
2 ELECTRON_EMC_5_MUON_5
2 ELECTRON_EMC_6_MUON_6_90PCT
2 ELECTRON_EMC_7_3PT7
2 ELECTRON_EMC_7_3PT7_PREREQ_TEST
2 ELECTRON_EMC_7_3PT7_PREREQ
2 ELECTRON_EMC_7_3PT7_PREREQ_V2
2 ELECTRON_EMC_7_3PT7_PREREQ_V3
2 ELECTRON_EMC_7_3PT7_PREREQ_V4
2 ELECTRON_EMC_7_3PT7_PREREQ_V5
2 ELECTRON_EMC_7_3_L1REPEAT
2 ELECTRON_EMC_7_3_PRESCALE_20
2 ELECTRON_EMC_7_3_PRESCALE_20_V2
2 ELECTRON_EMC_7_4PT8_PREREQ_V1
2 ELECTRON_EXTRA
2 EMPTY_CROSSING
2 EM_JET_5
2 EXECUTE_MUON_CLUSTERING
2 EXECUTE_MUON_CLUSTERING_OOPS
2 FHA_WEST_CRATE_1_20
2 FMU_100_100
2 FMU_100_100_100MILLIHZ
2 FMU_100_100_25MILLIHZ
2 FMU_100_25MILLIHZ
2 FMU_100_50MILLIHZ
2 FMU_100_CMU_6
2 FMU_100_L2AUTO
2 FMU_100_V2_PREREQ
2 FMU_DIMUON_PREREQ
2 FORWARD_MUON_2PT5
2 GOLD_DIMUON_5
2 JET_15_PRESCALE_100
2 JET_20
2 JET_20_PRESCALE_100
2 JET_20_PRESCALE_1000
2 JET_20_PRESCALE_200
2 JET_40
2 JET_40_PRESCALE_10
2 JET_40_PRESCALE_100
2 JET_40_PRESCALE_20
2 JET_5
2 JET_60
2 JET_60_PRESCALE_10
2 MET_20_CENTRAL_E_7_5
2 MET_20_TEXAS_FILTER_1_STIFF
2 MET_25_PEM_CEM_10_10
2 MET_40_TEXAS_FILTER_1
2 MIN_BIAS_CFT
2 MIN_BIAS_CFT_CLUSTER
2 MISSING_ET_10
2 MISSING_ET_10_L3TEST
2 MISSING_ET_20_CENTRAL_E_7_3X
2 MISSING_ET_20_CENTRAL_E_7_3
2 MISSING_ET_20_L3TEST
2 MISSING_ET_20_PEM_CEM_3_3
2 MISSING_ET_20_PEM_CEM_3_3_PR100
2 MISSING_ET_20_PEM_CEM_3_3_PR20
2 MISSING_ET_20_TEXAS_FILTER
2 MISSING_ET_25_PEM_CEM_10_10
2 MISSING_ET_25_PRESCALE_20
2 MISSING_ET_25_TEXAS_FILTER_8
2 MISSING_ET_25_TEXAS_FILTER_8_GEV
2 MISSING_ET_25_TEXAS_FILTER_8_V2
2 MISSING_ET_25_TEX_4
2 MISSING_ET_25_TEX_8_NOT_FWD
2 MISSING_ET_30_L1PHOTON
2 MISSING_ET_30_PHOTON
2 MISSING_ET_40
2 MISSING_ET_40_PRESCALE_10
2 MISSING_ET_40_TEXAS_FILTER_1
2 MISSING_ET_40_TEX_1
2 MULTIJET_40
2 MULTIJET_80_40
2 ONE_CLUSTER
2 PHOTON_10
2 PHOTON_15
2 PHOTON_15_PRESCALE_5
2 PHOTON_20
2 PHOTON_20_V2
2 PHOTON_20_V3
2 PHOTON_20_V4
2 PHOTON_5
2 PHOTON_CENTRAL_EMC_10
2 PHOTON_CENTRAL_EMC_10_V1
2 PHOTON_CENTRAL_EMC_23
2 PHOTON_CENTRAL_EMC_23_PS10
2 PHOTON_EMC_1
2 PHOTON_EMC_12_TEST
2 PHOTON_EMC_12_TEST_EAST
2 PHOTON_EMC_12_TEST_WEST
2 PHOTON_EMC_20
2 PHOTON_EMC_23
2 PHOTON_EMC_23_V2
2 PHOTON_EMC_EAST_10
2 PHOTON_EMC_WEST_10
2 PHOTON_GAS_15_TOTAL_ET_50
2 PHOTON_GAS_23
2 PHOTON_GAS_EMC_13
2 PHOTON_GAS_EMC_15
2 PHOTON_GAS_EMC_23
2 TAU_10_4PT8_CENTRAL_PHOTON_10_V1
2 TAU_10_4PT8_ELECTRON_5
2 TAU_10_4PT8_ELECTRON_5_V2

2 TAU_10_4PT8_GAS_PHOTON_10_V1
2 TAU_10_4PT8_MISSING_20
2 TAU_10_4PT8_MISSING_20_V2
2 TAU_10_4PT8_MUON_3_V1
2 TAU_10_4PT8_MUON_5
2 TAU_10_4PT8_MUON_5_V2
2 TAU_10_4PT8_PHOTON_10
2 TAU_10_4PT8_PHOTON_10_V2
2 TAU_20_9PT2
2 TAU_20_9PT2_V2
2 TAU_30_9PT2_V1
2 TOTAL_CLUSTER_EM_ET_10
2 TOTAL_CLUSTER_ET_10
2 TOTAL_EM_ET_10
2 TOTAL_EM_ET_100
2 TOTAL_EM_ET_60
2 TOTAL_EM_ET_70
2 TOTAL_ET_10
2 TOTAL_ET_100
2 TOTAL_ET_120
2 TOTAL_ET_150
2 TRIJET_15
2 TRIJET_20
3 BBC_INTIME_YMON
3 BBC_INTIME_YMON_V2
3 BBC_INTIME_YMON_V3
3 BBC_INTIME_YMON_V4
3 BBC_INTIME_YMON_V5
3 BBC_VERTEX_200
3 CENTRAL_ELECTRON_PHOTON
3 CENTRAL_ELECTRON_TEST1
3 CMU_FILT_V1
3 CMU_FILT_V2
3 CMU_FILT_V3
3 CMU_FILT_V4
3 CMU_FILT_V5
3 CMU_FILT_V6
3 CMU_FILT_V7
3 CTC_1GEV
3 CTC_TRACK_1GEV
3 CTC_TRACK_1GEV_V2
3 CTC_TRACK_3GEV
3 DATA_SQUEEZING
3 DFCTRK_FTN
3 DFEXPRESS_V1
3 DIELECTRON_L3_V1
3 DIELECTRON_L3_V2
3 DIMUON_L3_V1
3 DIMUON_L3_V2
3 DIMUON_L3_V3
3 DIMUON_L3_V4
3 DIMUON_L3_V5
3 DIMUON_L3_V6
3 DIMUON_L3_V7
3 DIPHOTON
3 DIPHOTON_V2
3 DIPHOTON_V3
3 DIPHOTON_V4
3 ELECTRON_CENTRAL_12
3 ELECTRON_CENTRAL_12_V1
3 ELECTRON_CENTRAL_12_V2
3 ELECTRON_CENTRAL_12_V3
3 ELECTRON_CENTRAL_12_V5
3 ELECTRON_CENTRAL_12_V6
3 ELECTRON_CENTRAL_12_V7
3 ELECTRON_CENTRAL_7
3 ELECTRON_CENTRAL_7_V1
3 ELECTRON_CENTRAL_7_V2
3 ELECTRON_CENTRAL_7_V3
3 ELECTRON_CENTRAL_7_V5
3 ELECTRON_CENTRAL_7_V6
3 ELECTRON_CENTRAL_7_V7
3 ELECTRON_CENTRAL_7_V8
3 ELECTRON_CENTRAL_7_V9
3 ELECTRON_CENTRAL_9
3 ELECTRON_MUON_L3_V1
3 ELECTRON_MUON_L3_V3
3 ELECTRON_MUON_L3_V4
3 ELECTRON_MUON_L3_V5
3 ELECTRON_MUON_L3_V6
3 ELECTRON_PLUG
3 ELECTRON_PLUG_V2
3 ELECTRON_PLUG_V3
3 ELECTRON_PLUG_V4
3 FASTER_DFCTRK
3 FMU_PR
3 FORWARD_MUON
3 FORWARD_MUON_PR
3 FORWARD_MUON_PR100_25_1
3 FORWARD_MUON_PR100_25
3 FORWARD_MUON_PR100_25_V2
3 FORWARD_MUON_PR100_25_V4
3 FORWARD_MUON_PR100_50
3 FORWARD_MUON_PR100_V4
3 FORWARD_MUON_PR100_V5
3 FORWARD_MUON_PR100_V7
3 FRACTION_TEST
3 HATFLT_V1
3 HATFLT_V2
3 JET_20_CLEANUP
3 JET_20_CLEANUP_V2
3 JET_20_L3
3 JET_40_CLEANUP
3 JET_40_CLEANUP_V2
3 JET_40_L3
3 JET_60_CLEANUP
3 JET_60_CLEANUP_V2
3 JET_60_L3

3 L3_JET_20_V1
3 L3_JET_40_V1
3 L3_JET_60_V1
3 L3_OUTPUT
3 L3_OUTPUT_SQZ1
3 L3_OUTPUT_TEST_TOWE
3 L3_PRINT_BUF
3 MISSING_ET_10
3 MISSING_ET_10A
3 MISSING_ET_10_V1
3 MISSING_ET_10_V2
3 MISSING_ET_10_V3
3 MISSING_ET_10_V4
3 MISSING_ET_10_V5
3 MISSING_ET_15_PHOTON
3 MISSING_ET_15_PHOTON_V1
3 MISSING_ET_15_PHO_V2
3 MISSING_ET_15_PHO_V3
3 MISSING_ET_15_PHO_V4
3 MISSING_ET_15_TEST
3 MISSING_ET_15_V10
3 MISSING_ET_15_V2
3 MISSING_ET_15_V3
3 MISSING_ET_15_V4
3 MISSING_ET_15_V5
3 MISSING_ET_15_V6
3 MISSING_ET_15_V7
3 MISSING_ET_15_V8
3 MISSING_ET_15_V9
3 MISSING_ET_5
3 MISSING_ET_KDIJET
3 MISSING_ET_KDIJET_TALK
3 MISSING_ET_KDIJET_V3
3 MISSING_ET_PHO_KDIJET
3 MISSING_ET_PHO_KDIJET_V3
3 MULTIJET_40_CLEANUP
3 MULTIJET_80_40_CLEANUP
3 OUTBNK
3 OUTBNK_CMUTST
3 OUTBNK_JET_TEST
3 OUTBNK_KADEL
3 OUTBNK_V1
3 OUTBNK_V10
3 OUTBNK_V11
3 OUTBNK_V12
3 OUTBNK_V14
3 OUTBNK_V2
3 OUTBNK_V3
3 OUTBNK_V4
3 OUTBNK_V5
3 OUTBNK_V6
3 OUTBNK_V7
3 OUTBNK_V8
3 OUTBNK_V9
3 PHOTON_CENTRAL_LO_PT_V0
3 PHOTON_CENTRAL_LSHR_V2
3 PHOTON_CENTRAL_LSHR_V3
3 PHOTON_CENTRAL_LSHR_V4
3 PHOTON_CENTRAL_LSHR_V5
3 PHOTON_CENTRAL_LSHR_V6
3 PHOTON_CENTRAL_LSHR_V7
3 PHOTON_CENTRAL_LSHR_10
3 PHOTON_CENTRAL_LSHR_V8
3 PHOTON_CENTRAL_LSHR_10_V2
3 PHOTON_CENTRAL_NOLSHR_V1
3 PHOTON_CENTRAL_NOLSHR_V3
3 PHOTON_CENTRAL_NOLSHR_V4
3 PHOTON_CENTRAL_NOLSHR_V5
3 PHOTON_CENTRAL_NOLSHR_V6
3 PHOTON_CENTRAL_NOLSHR_V7
3 PHOTON_CENTRAL_NOLSHR_V8
3 PHOTON_CENTRAL_NOLSHR_10
3 PHOTON_CENTRAL_NOLSHR_V9
3 PHOTON_CENTRAL_NOLSHR_10_V2
3 PHOTON_GAS_15_V1
3 PHOTON_GAS_FOR_TOP
3 PHOTON_GAS_FOR_TOP_V2
3 PHOTON_GAS_V1
3 PHOTON_GAS_V2
3 PHOTON_GAS_V3
3 PHOTON_SUMET_V1
3 PHOTON_SUMET_V2
3 PLUG_ELECTRON
3 REFORMAC
3 REFORMAT
3 REFORMAT_ASM
3 SATFLT
3 TAU_10_CENTRAL_PHOTON_10
3 TAU_10_CENTRAL_PHOTON_10_V2
3 TAU_10_ELECTRON_5_V1
3 TAU_10_ELECTRON_5_V2
3 TAU_10_GAS_PHOTON_10
3 TAU_10_GAS_PHOTON_10_V2
3 TAU_10_MISSING_ET_15_V2
3 TAU_10_MISSING_ET_15_V1
3 TAU_10_MISSING_ET_15_V3
3 TAU_10_MUON_3_V1
3 TAU_10_MUON_3_V2
3 TAU_10_MUON_5_V1
3 TAU_20_V1
3 TAU_20_V2
3 TAU_30_V1
3 TAU_30_V2
3 TAU_L3_1
3 TAU_L3_2
3 TAU_L3_3
3 TAU_L3_4
3 TAU_L3_5

3 TAU_L3_6
3 TAU_L3_7
3 TAU_L3_8
3 TOTAL_EM_ET_60_V1
3 TOTAL_EM_ET_60_V2
3 TOTAL_ET_110_V1
3 TOTAL_ET_120_CLEANUP
3 TOTAL_ET_120_CLEANUP_V1
3 TOTAL_ET_120_CLEANUP_V2
3 TOTAL_ET_L3
3 TRIJET_20_CLEANUP
3 TRIJET_20_CLEANUP_V2
3 TRIJET_L3
3 VERIFY_CDF152
3 VERTEX_BBC
3 VERTEX_BBC_100
3 VERTEX_BBC_150_DTE
3 VERTEX_BBC_200
3 VERTEX_VTPC_200
3 VERTEX_VTVERT_200
3 VERTEX_VTVERT_500
3 VTPC_VERTEX

10 APPENDIX III - COMPILER OPTIONS TABLE

```
!       B0::TRIGGER$LIBRARY:OPTTAB.TXT
!
!       Options table used to check syntax of Levels 0,1,2 trigger tables.
!       When this is changed, the program TRIGGER$PROGRAMS:DBSTUFF must
!       be run to put this file into the run conditions database.
!


!                        --------------------
!                       |  Level 0 Options   |
!                        --------------------

LEVEL 0

        SELECT  AUTOMATIC_LEVEL0_ACCEPT
        SELECT  AUTOMATIC_LEVEL0_REJECT
        SELECT  BBC_HALO
        SELECT  BBC_EAST
        SELECT  BBC_WEST
        SELECT  CTC_LAYER0_HIT
        SELECT  CTC_LAYER2_HIT
        SELECT  CDT
            PARAMETER   CDT_HITS >= 1:4 (Layers)
        EXECUTE MAIN_RING_COUNTERS
        EXECUTE MAIN_RING_INHIBIT
        SELECT  EMPTY_CROSSING
        EXECUTE FORCE_LEVEL1
        SELECT  SACSIF

!                        --------------------
!                       |  Level 1 Options   |
!                        --------------------

LEVEL 1
        EXECUTE LEVEL1_RATE_LIMITING    ! Use 0:16 times/trigger table
            PARAMETER   BURST_LOAD_RATE = 0.00931:38.147 (Hertz)
            PARAMETER   BURST_COUNT     = 0:15

        SELECT  AUTOMATIC_LEVEL1_ACCEPT
        SELECT  AUTOMATIC_LEVEL1_REJECT
        SELECT  BBC_EAST
        SELECT  BBC_WEST
        SELECT  FMU_DIMUON
        SELECT  EMPTY_CROSSING

! The Level 1 calorimetry triggers

        SELECT  LEVEL1_CALORIMETRY      ! Use 0:4 times/trigger table
            PARAMETER   CALORIMETER_SUMMER = 0:3
            PARAMETER   EM_TOWER_THRESHOLD     > 0.:51. (GeV)
            PARAMETER   HADRON_TOWER_THRESHOLD > 0.:51. (GeV)
            CUT         EM_ET     > 0.:511.75 (GeV)
            CUT         HADRON_ET > 0.:511.75 (GeV)
            CUT         TOTAL_ET  > 0.:511.75 (GeV)
```

```
        SELECT  LEVEL1_CALORIMETRY_SINGLE_CRATE ! Use 0:4 times/trigger table
            PARAMETER   CALORIMETER_SUMMER = 0:3
            PARAMETER   WFEM_TOWER_THRESHOLD  > 0.:51. (GeV)
            PARAMETER   WPEM_TOWER_THRESHOLD  > 0.:51. (GeV)
            PARAMETER   CEM_TOWER_THRESHOLD   > 0.:51. (GeV)
            PARAMETER   EPEM_TOWER_THRESHOLD  > 0.:51. (GeV)
            PARAMETER   EFEM_TOWER_THRESHOLD  > 0.:51. (GeV)
            PARAMETER   WFHAD_TOWER_THRESHOLD > 0.:51. (GeV)
            PARAMETER   WPHAD_TOWER_THRESHOLD > 0.:51. (GeV)
            PARAMETER   CHAD_TOWER_THRESHOLD  > 0.:51. (GeV)
            PARAMETER   EPHAD_TOWER_THRESHOLD > 0.:51. (GeV)
            PARAMETER   EFHAD_TOWER_THRESHOLD > 0.:51. (GeV)
            CUT         EM_ET     > 0.:511.75 (GeV)
            CUT         HADRON_ET > 0.:511.75 (GeV)
            CUT         TOTAL_ET  > 0.:511.75 (GeV)

! Level 1 Missing Et

        SELECT  LEVEL1_CALORIMETRY_MISSING_ET   ! Use 0:4 times/trigger table
            PARAMETER   CALORIMETER_SUMMER = 0:3
            PARAMETER   EM_TOWER_THRESHOLD     > 0.:51. (GeV)
            PARAMETER   HADRON_TOWER_THRESHOLD > 0.:51. (GeV)
            CUT         TOTAL_EX > 0.:511.75 (GeV)
            CUT         TOTAL_EY > 0.:511.75 (GeV)

! Central muon Level 1

        SELECT  CMU_LEVEL1              ! Select cuts 0:1 times/trigger table
            PARAMETER   CMU_HITS >= 2:4 (Layers)
                                        ! choices are 2 or 4 layers
            CUT         CMU_LEVEL1_PT > 2.:10. (GeV/c)
                                        ! choices are 2.,3.,4.,5.,10. (GeV/c)

        SELECT  DIMUON
            PARAMETER   CMU_HITS >= 2:4 (Layers)
                                        ! choices are 2 or 4 layers
            CUT         CMU_LEVEL1_PT > 2.:10. (GeV/c)
                                        ! choices are 2.,3.,4.,5.,10. (GeV/c)

! Forward muon Level 1

        SELECT  FMU_LEVEL1              ! Select cuts 0:1 times/trigger table
            CUT SINGLE_FMU_PT = 50.:300. (%)
                                        ! choices are 50.,100.,300. (%)
            CUT TWO_FMU_PT    = 50.:300. (%)
                                        ! choices are 50.,100.,300. (%)

! CTC Freeman/Foster processor

        SELECT  CFT_LEVEL1              ! Select cuts 0:1 times/trigger table
            PARAMETER   CFT_LEVEL1_MISSES <= 0:3
            CUT         CFT_LEVEL1_PT > 3.0:25.0 (GeV/c)
                        ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)
```

```
! (9/22/88 REPLACED AS A SPIGOT ON CDF FRED BY FMU_DIMUON)
! Their second (lower?) Pt threshold
!
!       SELECT  CFT_LEVEL1_LOW          ! Select cuts 0:1 times/trigger table
!           PARAMETER   CFT_LEVEL1_MISSES <= 0:3
!           CUT         CFT_LEVEL1_PT > 3.0:25.0 (GeV/c)
                        ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)



!                        --------------------
!                       |  Level 2 Options   |
!                        --------------------

LEVEL 2

! Arbitrary hardware test procedure

        EXECUTE TEST2
            PARAMETER   PARM2 = -999999:999999

! Cluster finder parameters

        EXECUTE CLUSTER_FINDER          ! Use 0:1 times/trigger table
            PARAMETER   CALORIMETER_SUMMER = 0:3
            PARAMETER   SEED_ET     > 0.:51. (GeV)
            PARAMETER   SHOULDER_ET > 0.:51. (GeV)

        EXECUTE EM_CLUSTER_FINDER       ! Use 0:1 times/trigger table
            PARAMETER   CALORIMETER_SUMMER = 0:3
            PARAMETER   EM_SEED_ET     > 0.:51. (GeV)
            PARAMETER   EM_SHOULDER_ET > 0.:51. (GeV)

        EXECUTE CLUSTER_FINDER_SINGLE_CRATE     ! Use 0:1 times/trigger table
            PARAMETER   CALORIMETER_SUMMER = 0:3
            PARAMETER   WFEM_SEED_ET      > 0.:51. (GeV)
            PARAMETER   WPEM_SEED_ET      > 0.:51. (GeV)
            PARAMETER   CEM_SEED_ET       > 0.:51. (GeV)
            PARAMETER   EPEM_SEED_ET      > 0.:51. (GeV)
            PARAMETER   EFEM_SEED_ET      > 0.:51. (GeV)
            PARAMETER   WFHAD_SEED_ET     > 0.:51. (GeV)
            PARAMETER   WPHAD_SEED_ET     > 0.:51. (GeV)
            PARAMETER   CHAD_SEED_ET      > 0.:51. (GeV)
            PARAMETER   EPHAD_SEED_ET     > 0.:51. (GeV)
            PARAMETER   EFHAD_SEED_ET     > 0.:51. (GeV)
            PARAMETER   WFEM_SHOULDER_ET  > 0.:51. (GeV)
            PARAMETER   WPEM_SHOULDER_ET  > 0.:51. (GeV)
            PARAMETER   CEM_SHOULDER_ET   > 0.:51. (GeV)
            PARAMETER   EPEM_SHOULDER_ET  > 0.:51. (GeV)
            PARAMETER   EFEM_SHOULDER_ET  > 0.:51. (GeV)
            PARAMETER   WFHAD_SHOULDER_ET > 0.:51. (GeV)
            PARAMETER   WPHAD_SHOULDER_ET > 0.:51. (GeV)
            PARAMETER   CHAD_SHOULDER_ET  > 0.:51. (GeV)
```

```
        PARAMETER   EPHAD_SHOULDER_ET > 0.:51. (GeV)
        PARAMETER   EFHAD_SHOULDER_ET > 0.:51. (GeV)

! Muon cluster-finding

    EXECUTE MUON_CLUSTER_FINDER              ! Use 0:4 times/trigger table
        PARAMETER   CALORIMETER_SUMMER = 0:3
        PARAMETER   CMU_MAP_VERSION = 0:1
                                  ! 0 has brass muons scalers in matchbox
                                  ! 1 has gold muons scalers in matchbox
                                  ! other maps could mask "bad" muon/CTC
                                  ! areas, in principle...
        PARAMETER   CMU_PHI_MATCH = 1:3 (Wedges)
                                  ! choices are 1., 3. Wedges

! CTC Stiff track cluster_finding

    EXECUTE STIFF_CLUSTER_FINDER             ! Use 0:4 times/trigger table
        PARAMETER   CALORIMETER_SUMMER = 0:3

! Level 1 Repeat cluster parameters

    EXECUTE LEVEL1_REPEAT                    ! Use 0:4 times/trigger table
        PARAMETER   CALORIMETER_SUMMER = 0:3
        PARAMETER   EM_TOWER_THRESHOLD     > 0.:51. (GeV)
        PARAMETER   HADRON_TOWER_THRESHOLD > 0.:51. (GeV)

    EXECUTE LEVEL1_REPEAT_SINGLE_CRATE       ! Use 0:4 times/trigger table
        PARAMETER   CALORIMETER_SUMMER = 0:3
        PARAMETER   WFEM_TOWER_THRESHOLD  > 0.:51. (GeV)
        PARAMETER   WPEM_TOWER_THRESHOLD  > 0.:51. (GeV)
        PARAMETER   CEM_TOWER_THRESHOLD   > 0.:51. (GeV)
        PARAMETER   EPEM_TOWER_THRESHOLD  > 0.:51. (GeV)
        PARAMETER   EFEM_TOWER_THRESHOLD  > 0.:51. (GeV)
        PARAMETER   WFHAD_TOWER_THRESHOLD > 0.:51. (GeV)
        PARAMETER   WPHAD_TOWER_THRESHOLD > 0.:51. (GeV)
        PARAMETER   CHAD_TOWER_THRESHOLD  > 0.:51. (GeV)
        PARAMETER   EPHAD_TOWER_THRESHOLD > 0.:51. (GeV)
        PARAMETER   EFHAD_TOWER_THRESHOLD > 0.:51. (GeV)

! Prescaling of Level 2 triggers

    EXECUTE LEVEL2_PRESCALING
        PARAMETER   PRESCALE_FACTOR = 1:2147483647

! Automatic selections

    SELECT  AUTOMATIC_LEVEL2_ACCEPT
    SELECT  AUTOMATIC_LEVEL2_REJECT

! Level 1 inputs selected at Level 2 (from Mercury-L1)

    SELECT  LEVEL1_CALORIMETRY_0
    SELECT  LEVEL1_CALORIMETRY_1
```

```
        SELECT  LEVEL1_CALORIMETRY_2
        SELECT  LEVEL1_CALORIMETRY_3
        SELECT  BBC_EAST
        SELECT  BBC_WEST
        SELECT  CMU_LEVEL1
        SELECT  FMU_LEVEL1
        SELECT  CFT_LEVEL1
        SELECT  FMU_DIMUON
        SELECT  DIMUON
        SELECT  FORWARD_SILICON

! The following use quantities calculated in Mercury-ET

        SELECT  JET                         ! Select 0:3 thresholds/trigger table
            PARAMETER   ET_THRESHOLD    >= 0.:511.5 (GeV)
            CUT         NUMBER_OF_JETS >= 0:15

        SELECT  EM_JET                      ! Select 0:3 thresholds/trigger table
            PARAMETER   EM_ET_THRESHOLD >= 0.:511.5 (GeV)
            CUT         NUMBER_OF_JETS  >= 0:15

        SELECT  TOTAL_CLUSTER_ET            ! Select 0:2 thresholds/trigger table
            CUT         TOTAL_ET >= 0.:511.5 (GeV)

        SELECT  TOTAL_CLUSTER_EM_ET         ! Select 0:2 thresholds/trigger table
            CUT         TOTAL_EM_ET >= 0.:511.5 (GeV)

        SELECT  TOTAL_ET                    ! Select 0:3 thresholds/trigger table
            CUT         TOTAL_ET >= 0.:511.5 (GeV)

        SELECT  TOTAL_EM_ET                 ! Select 0:3 thresholds/trigger table
            CUT         TOTAL_EM_ET >= 0.:511.5 (GeV)

! The following use quantities calculated in Mercury-MU

        SELECT  FORWARD_MUON                ! Select 0:2 thresholds/trigger table
            PARAMETER   TRACK_PT >= 3.0:25.0 (GeV/c)
                        ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)
            PARAMETER   CALORIMETER_ET <= 0.:511.5 (GeV)
            CUT         NUMBER_OF_FORWARD_MUONS >= 0:15

        SELECT  CENTRAL_MUON                ! Select 0:2 thresholds/trigger table
            PARAMETER   TRACK_PT >= 3.0:25.0 (GeV/c)
                        ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)
            PARAMETER   CALORIMETER_ET <= 0.:511.5 (GeV)
            CUT         NUMBER_OF_CENTRAL_MUONS >= 0:15

        SELECT  MISSING_ET                  ! Select 0:3 thresholds/trigger table
            CUT         MISSING_ET_SQUARED >= 0.:131071. (GeV**2)

        SELECT  CALOR_CLUSTER
            CUT         NUMBER_OF_CALOR_CLUSTERS >= 0:15

        SELECT  LEVEL1_REPEAT_CLUSTER
```

```
        CUT          NUMBER_OF_LEVEL1_REPEAT_CLUSTERS >= 0:15

    SELECT  MUON_CLUSTER
        CUT          NUMBER_OF_MUON_CLUSTERS >= 0:15

    SELECT  STIFF_CLUSTER
        CUT          NUMBER_OF_STIFF_CLUSTERS >= 0:15

    SELECT  EM_CALOR_CLUSTER
        CUT          NUMBER_OF_EM_CALOR_CLUSTERS >= 0:15

! The following use quantities calculated in Mercury-EL

    SELECT  PHOTON                    ! Select 0:2 thresholds/trigger table
        PARAMETER    TOTAL_ET_OVER_EM_ET <= 1.125:1.125 ! Fixed cuts
        PARAMETER    CENTRAL_TOWERS <= 4:4              ! in Mercury-EL PROM
        PARAMETER    PLUG_TOWERS    <= 4:4              !  "       "       "
        PARAMETER    FORWARD_TOWERS <= 4:4              !  "       "       "
        PARAMETER    ETA_MIN = 0.0:0.0                  !  "       "       "
        PARAMETER    ETA_MAX = 4.25:4.25                !  "       "       "
        PARAMETER    EM_ET_THRESHOLD >= 0.:511.5 (GeV)  ! Selectable cuts
        CUT          NUMBER_OF_PHOTONS >= 0:15

    SELECT  ELECTRON                  ! Select 0:3 thresholds/trigger table
        PARAMETER    TOTAL_ET_OVER_EM_ET <= 1.125:1.125 ! Fixed cuts
        PARAMETER    CENTRAL_TOWERS <= 4:4              ! in Mercury-EL PROM
        PARAMETER    ETA_MIN = 0.0:0.0                  !  "       "       "
        PARAMETER    ETA_MAX = 4.25:4.25                !  "       "       "
        PARAMETER    EM_ET_THRESHOLD >= 0.:511.5 (GeV)  ! Selectable cuts
        PARAMETER    TRACK_PT >= 3.0:25.0 (GeV/c)
                     ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)
        CUT          NUMBER_OF_ELECTRONS >= 0:15

! The following use quantities calculated in Mercury-ELX
! (2nd pass, EM-only cluster finding used)

    SELECT  EM_CLUSTER_PHOTON         ! Select 0:2 thresholds/trigger table
        PARAMETER    TOTAL_ET_OVER_EM_ET <= 1.125:1.125 ! Fixed cuts
        PARAMETER    CENTRAL_TOWERS <= 15:15            ! in Mercury-ELX PROM
        PARAMETER    PLUG_TOWERS    <= 15:15            !  "       "       "
        PARAMETER    FORWARD_TOWERS <= 15:15            !  "       "       "
        PARAMETER    ETA_MIN = 0.0:0.0                  !  "       "       "
        PARAMETER    ETA_MAX = 4.25:4.25                !  "       "       "
        PARAMETER    EM_ET_THRESHOLD >= 0.:511.5 (GeV)  ! Selectable cuts
        CUT          NUMBER_OF_EM_CLUSTER_PHOTONS >= 0:15

    SELECT  EM_CLUSTER_ELECTRON       ! Select 0:3 thresholds/trigger table
        PARAMETER    TOTAL_ET_OVER_EM_ET <= 1.125:1.125 ! Fixed cuts
        PARAMETER    CENTRAL_TOWERS <= 15:15            ! in Mercury-ELX PROM
        PARAMETER    ETA_MIN = 0.0:0.0                  !  "       "       "
        PARAMETER    ETA_MAX = 4.25:4.25                !  "       "       "
        PARAMETER    EM_ET_THRESHOLD >= 0.:511.5 (GeV)  ! Selectable cuts
        PARAMETER    TRACK_PT >= 3.0:25.0 (GeV/c)
                     ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)
```

```
        CUT         NUMBER_OF_EM_CLUSTER_ELECTRONS >= 0:15

! The following use quantities calculated in Mercury-ELY
! (2nd pass, EM-only cluster finding used, 2nd board )

! Note: this photon option is for gas photons only

      SELECT  EM_CLUSTER_PHOTON_2     ! Select 0:2 thresholds/trigger table
          PARAMETER   TOTAL_ET_OVER_EM_ET <= 1.125:1.125 ! Fixed cuts
          PARAMETER   CENTRAL_TOWERS <= 15:15            ! in Mercury-ELY PROM
          PARAMETER   PLUG_TOWERS    <= 15:15            !  "       "       "
          PARAMETER   FORWARD_TOWERS <= 15:15            !  "       "       "
          PARAMETER   ETA_MIN = 1.05:1.05                !  "       "       "
          PARAMETER   ETA_MAX = 4.25:4.25                !  "       "       "
          PARAMETER   EM_ET_THRESHOLD >= 0.:511.5 (GeV)  ! Selectable cuts
          CUT         NUMBER_OF_EM_CLUSTER_PHOTONS_2 >= 0:15

      SELECT  EM_CLUSTER_ELECTRON_2   ! Select 0:3 thresholds/trigger table
          PARAMETER   TOTAL_ET_OVER_EM_ET <= 1.125:1.125 ! Fixed cuts
          PARAMETER   CENTRAL_TOWERS <= 15:15            ! in Mercury-ELY PROM
          PARAMETER   ETA_MIN = 0.0:0.0                  !  "       "       "
          PARAMETER   ETA_MAX = 4.25:4.25                !  "       "       "
          PARAMETER   EM_ET_THRESHOLD >= 0.:511.5 (GeV)  ! Selectable cuts
          PARAMETER   TRACK_PT >= 3.0:25.0 (GeV/c)
                      ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)
          CUT         NUMBER_OF_EM_CLUSTER_ELECTRONS_2 >= 0:15

! The following use quantities calculated in Mercury-TAU

      SELECT  TAU             ! Select 0:3 thresholds/trigger table
          PARAMETER   EM_ET_OVER_TOTAL_ET <= 0.890625    ! Fixed cuts
          PARAMETER   CENTRAL_TOWERS <= 2:2              ! in Mercury-TAU PROM
          PARAMETER   ETA_MIN = 0.0:0.0                  !  "       "       "
          PARAMETER   ETA_MAX = 4.25:4.25                !  "       "       "
          PARAMETER   ET_THRESHOLD >= 0.:511.5 (GeV)     ! Selectable cuts
          PARAMETER   TRACK_PT >= 3.0:25.0 (GeV/c)
                      ! 90% eff at  3.0,3.7,4.8,6.0,9.2,13.0,16.7,25.0 (GeV/c)
          CUT         NUMBER_OF_TAUS >= 0:15

! Other triggers:

      SELECT  TEXAS_FILTER
          CUT         HIGH_ET_JET_MIN_EM_ET >= 0.5:511.5 (GeV)

! Cuts on cluster quantities in Cluster Memories pointed to by Mercury indices

      SELECT  SINGLE_CLUSTER_CUT
          PARAMETER   CLUSTER_TYPE = 1:15
                      ! 1=highest-Et clust,      2=2nd highest-Et clust
                      ! 3=highest-EM Et clust,   4=2nd highest-EM Et clust
                      ! 5=highest-EM Et photon
                      ! 6=highest-EM Et electron
                      ! 7=highest-EM Et 2nd pass photon
```

```
                    ! 8=highest-EM Et 2nd pass electron
                    ! 9=highest-Et tau "photon"
                    ! 10=highest-Et tau
                    ! 11=highest |Pt| forward muon
                    ! 12=highest |Pt| central muon
                    ! 13=Level 1 Repeat cluster
                    ! 14=highest-EM Et 2nd pass photon 2nd board
                    ! 15=highest-EM Et 2nd pass electron 2nd board
        PARAMETER   CLUSTER_QUANTITY = 1:22
                    ! EM:  Et=1 Ey=2 Ex=3 <Y>=4 Yrms=5 <PHI>=6 PHIrms=7
                    ! Tot: Et=8 Ey=9 Ex=10 <Y>=11 Yrms=12 <PHI>=13 PHIrms=14
                    ! Other: Clcode=15 Ntowers=16 Yseed=17 PHIseed=18
                    !        Stiff=19 Pt=20 Charge=21
                    !        |Yseed-Ycenter|=22  (range 0-20, added 10/3/88)
        PARAMETER   COMPARE_TYPE = 1:6
                    ! 1=.EQ.  2=.NE.  3=.GE.  4=.LE.  5=.GT.  6=.LT.
        CUT THRESHOLD = 0:1023

! Cuts on cluster quantities in Cluster Memories pointed to by Mercury indices

    SELECT  TWO_CLUSTER_CUT
        PARAMETER   CLUSTER1_TYPE = 1:15
        PARAMETER   CLUSTER2_TYPE = 1:15
                    ! 1=highest-Et clust,     2=2nd highest-Et clust
                    ! 3=highest-EM Et clust,  4=2nd highest-EM Et clust
                    ! 5=highest-EM Et photon
                    ! 6=highest-EM Et electron
                    ! 7=highest-EM Et 2nd pass photon
                    ! 8=highest-EM Et 2nd pass electron
                    ! 9=highest-Et tau "photon"
                    ! 10=highest-Et tau
                    ! 11=highest |Pt| forward muon
                    ! 12=highest |Pt| central muon
                    ! 13=Level 1 Repeat cluster
                    ! 14=highest-EM Et 2nd pass photon 2nd board
                    ! 15=highest-EM Et 2nd pass electron 2nd board
        PARAMETER   CLUSTER_QUANTITY = 1:23
                    ! EM:  Et=1 Ey=2 Ex=3 <Y>=4 Yrms=5 <PHI>=6 PHIrms=7
                    ! Tot: Et=8 Ey=9 Ex=10 <Y>=11 Yrms=12 <PHI>=13 PHIrms=14
                    ! Other: Clcode=15 Ntowers=16 Yseed=17 PHIseed=18
                    !        Stiff=19 Pt=20 Charge=21
                    !        |Yseed-Ycenter|=22  (range 0-20, added 10/3/88)
                    !        Distance=23
        PARAMETER   COMPARE_TYPE = 1:6
                    ! 1=.EQ.  2=.NE.  3=.GE.  4=.LE.  5=.GT.  6=.LT.
        PARAMETER   OPERATION = 1:3
                    ! 1= ADD 2= SUBTRACT 3= SUBTRACT WTH ABSOLUTE VALUE
        CUT THRESHOLD = 0:1023

! Cuts on cluster quantities in Cluster Memories pointed to by Mercury indices

    SELECT  THREE_CLUSTER_CUT
        PARAMETER   CLUSTER1_TYPE = 1:15
        PARAMETER   CLUSTER2_TYPE = 1:15
```

```
PARAMETER   CLUSTER3_TYPE = 1:15
            ! 1=highest-Et clust,      2=2nd highest-Et clust
            ! 3=highest-EM Et clust,  4=2nd highest-EM Et clust
            ! 5=highest-EM Et photon
            ! 6=highest-EM Et electron
            ! 7=highest-EM Et 2nd pass photon
            ! 8=highest-EM Et 2nd pass electron
            ! 9=highest-Et tau "photon"
            ! 10=highest-Et tau
            ! 11=highest |Pt| forward muon
            ! 12=highest |Pt| central muon
            ! 13=Level 1 Repeat cluster
            ! 14=highest-EM Et 2nd pass photon 2nd board
            ! 15=highest-EM Et 2nd pass electron 2nd board
PARAMETER   CLUSTER_QUANTITY = 1:22
            ! EM:  Et=1 Ey=2 Ex=3 <Y>=4 Yrms=5 <PHI>=6 PHIrms=7
            ! Tot: Et=8 Ey=9 Ex=10 <Y>=11 Yrms=12 <PHI>=13 PHIrms=14
            ! Other: Clcode=15 Ntowers=16 Yseed=17 PHIseed=18
            !        Stiff=19 Pt=20 Charge=21
            !        |Yseed-Ycenter|=22  (range 0-20, added 10/3/88)
PARAMETER   COMPARE_TYPE = 1:6
            ! 1=.EQ.  2=.NE.  3=.GE.  4=.LE.  5=.GT.  6=.LT.
PARAMETER   OPERATION1 = 1:3
            ! Performed between clusters #1 & #2
            ! 1= Add 2= Subtract 3= Subtract wth absolute value
PARAMETER   OPERATION2 = 1:3
            ! Performed between (#1 & #2) result & cluster #3
            ! 1= Add 2= Subtract 3= Subtract wth absolute value
CUT THRESHOLD = 0:1023

END_TABLE
```